

BUSINESS PLANNING SERVICES

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Unilever Computer Services Limited

NEWS IN BRIEF

Leipzig debut for Robotron virtual machine

THE first virtual memory computer from Eastern Europe is expected to be unveiled at next year's Leipzig Fair by the East German organisation Robotron which hopes to get 100 Megabyte disc drives from the West. As expected (CW, April 14) the machine will be the 1055 mainframe. This is the largest member of the Esst European unified range (Riad).

This information was given to a US government export control committee by Robert Koehn, a systems strategy consultant at Control Data.

Taxmen scrap plan

THE Inland Revenue has abandoned its plans to set up an ICL 2970 installation at Bootle, Merseyside. This location, where the completion of the data processing centre has been dogged for several years by industrial disputes (CW, October 2, 1975), was one of three earmarked by the Inland Revenue for PAYE processing.

IBM split

US sources say that IBM is planning to split the office products division of its general business group into two divisions: office products involving stand-alone products like typewriters; and office systems taking in products like the System 8 word-processor.

NRDC profits

PRE-TAX profit of £10.82m for the year ended March 31, 1977, against £3.73m for the previous year, has been announced by the National Research Development Corporation.

CORAL 66 for PDP-11

The CORAL 66 compiler for the PDP-11 developed at the Royal Military College of Signals is available under license.

The Compiler has been rigorously tested and is offered with full maintenance and support. IECCA confirm that the compiler complies with the Official Definition. Available IECCA benchmark results show this compiler to be a 7.2 times faster on compilation, 22% less code instructions and 54% improvement in code size and execution efficiency when compared, on similar computers, with the other commercially available CORAL 66 compiler for the PDP-11.

The AMES CORAL 66 compiler is designed to be used for real-time programs. It produces relocatable re-entrant code. All procedures are used recursively and identifiers used before declaration. The Compiler contains a standard I/O library. Among support features is a set of fast-time primitives, allowing procedures to be run in parallel processes, and include queue and buffer handling, off-line and on-line, process scheduling, time slicing and asynchronous device control. Optionally the compiler can compile to PAL Assembler or, if the in-line code facility is not used, to executable binary code.

The compiler can be used with OOS, RT11, RSX and IAS operating systems.

An information document is available on request. This is intended for computer managers, who may not have considered the use of CORAL 66 and for experienced CORAL 66 users. The document reassures the advantages of CORAL 66 and the use of this compiler. Maintenance, installation, support and pricing information is given. Demonstrations of the compiler and potential customer computers are welcomed.

IPAS computer language compilers and basic software ensure interoperability of source programs, while taking full advantage of computer hardware, and the protection of investment in software.

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COMPUTER WEEKLY

Now micros can emulate a PDP-8

By Martin Banks

A SOFTWARE emulator has been introduced in the US which runs DEC PDP-8 programs on an Intel 8080 or Zilog Z-80.

Called the Simul8or, the system was developed by the Amide Corporation of Massachusetts and could soon be available in Europe.

In the UK, Houdie Computing is negotiating with Amide to become agents. Other agents are being sought throughout Europe.

Requiring a minimum configuration of 12K bytes of read/write memory and a teletype-printer terminal, the Simul8or provides almost exact emulation of a PDP-8, except for timing, says Amide co-founder Eric Hohn. Available in two versions, it has a US price of \$20 for the paper tape version, and \$23 cassette version, both of which are produced in Intel hexadecimal format.

Among the features it provides are a virtual software front panel, which allows users to perform all PDP-8 front panel functions from the terminal in software. It also adds some features to the capabilities of the original mini, in that users equipped with an 8080 console can obtain a dynamic display of the PDP-8 data on the console lights, and such functions as single step program running can be carried out.

"Virtually every program written for the PDP-8, with a maximum memory usage of 4K, can be run on microcomputers using the emulator," Hohn stated. "This includes a wide range of commercially available and DEC User Society produced programs, many of which are very reasonably priced." The only exceptions to this are programs written in Pascal and Simul8or Basic.

It does mean, however, that a wide range of

programs written in Algol, Fortran and other high level languages can now be run on a microcomputer.

The main drawback is in operating speed. For software written using an Interrupt structure, the emulator is forced to poll all I/O ports in turn, and the operating speed can be anything up to 100 times slower than the microcomputer. Software that does not employ interrupts is considerably faster, but is still about 50 times slower than the original.

Although the initial marketing strategy is aimed primarily at the large US personal computer market, Hohn is also considering the scope available in the small business field.

Possible future projects he is considering include a version of the emulator for the Motorola 6800 and, possibly an emulator for the PDP-11.

Modcomp drops business systems

DECIDING to concentrate its resources in its well-established industrial marketplace, Modcomp has dropped out of the commercial systems business in the US and discontinued the operations of its subsidiary, Modcomp Business Systems of Lexington, Massachusetts.

This was set up only eight months after Modcomp acquired and renamed ECS Information Systems of Lexington, Massachusetts.

2,000 staff strike

ABOUT 2,000 computer staff were involved in Tuesday's half-day strike by members of the Society of Civil and Public Servants. Installations affected included the Swansea Driver Vehicle Licensing Centre, the Customs and Excise centre at Southend which handles VAT, and the Laces cargo handling system at Heathrow.

The action was in protest against the government's refusal to revive an independent Pay Research Unit (CW, October 20).

According to Campbell Christie, deputy secretary-general of the SCPS, computer centres would be a main target of any further action.

general manager, John Pitt, told Computer Weekly that Modcomp in Europe was deliberately hanging back from actively selling commercial systems until the software and training support implications were fully understood (CW, September 22).

Kenneth Harple scotched rumours that John Lobb, who was made chairman of Modcomp last month, was behind the move to close down Modcomp Business Systems. He pointed out the decision was made before Lobb became chairman.

Modcomp Business Systems currently has a \$1 million contract with Burroughs to supply a distribution software package, and Modcomp says that this will be completed.

Modcomp Business Systems was the smallest of the company's four main marketing divisions. The three remaining divisions in ascending order of importance, are communications, OEM and industrial control and instrumentation.



A DECADE ago, Sir William Barlow (above) was managing director of English Electric Computers. Last week he succeeded Sir William Ryland as chairman of the Post Office.

He believes that the Post Office should be split into separate corporations for post and for telecommunications, as recommended in the Carter Committee report.

"Practically speaking, it is a matter of years before this could happen, and meanwhile I am concerned with achieving the maximum amount of decentralisation within each of the businesses. The post, telecommunications, data processing services and other run as separate units with their own managing directors and I want to strengthen that kind of structure," he said.

Sir William Barlow joined the Post Office from the chairmanship of half-bearing nickel at Rneome Hoffman and Pollard.

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Lloyds put IBM lease at risk

LEASING companies are taking a risk following a decision by Lloyds to suspend temporarily payments with coverage clients involving escape clauses in their contracts.

The escape clause obliges the lessee to back out of the agreement after three years instead of negotiating the term of, typically, seven years.

Leasing companies do not world provide the due diligence, agreements and Lloyds writers insure them against being invoked.

This could happen if a modern machine superior price/performance becomes available and the Lloyds writers are currently covering whether the recent, announced 3031 and 3032, should be in plentiful supply for three or four years, with effect on 370 agreements now.

A number of leasing companies have made progress to the underwriters to ensure that this risk is kept under control and industry sources say that the underwriters are providing coverage until a few weeks. If policies are not affected.

Plessey ahead

A STRONG advance is recorded by Plessey in its September 30, 1977, turnover up 19% to £21.8 million, up 10% to £23.5 million. UK exports were up 5% and overseas business accounted for 57% of total business.

Oracle halted

ORACLE TV, television information service, has been off the air since the beginning of the year due to a shift in pay dispute among members of the Association of Cinematograph and Television Technicians.

The service was halted when Oracle was due to begin 13 hour-a-day broadcasts.

Going to schools

A RANGE of packaged systems built round PDP-11 minicomputers has been introduced to the education market by Digital Equipment.

The systems range from the ES210/C, a single user machine based on a PDP-11/03 with two floppy discs, to the ES75/W, based on the PDP-11/70 and designed for administrative jobs as well as education.

New BCS group

A SPECIALIST group concerned with the formal aspects of computing science could be set up by the British Computer Society following a meeting at 2pm on November 30 at University College, London.

Computer users in general are invited to the meeting.

Chairman resigns

CONSULTANCY and software house Systemsolve has come further under the control of BCS a big bureau subsidiary.

Systemsolve with the resignation of the Systemsolve chairman and managing director Richard Holway, Holway's 20% share in Systemsolve has been sold to the company's three executive directors and to Dataforce, which already owned 40%.

Books offer

A NEW special offer is introduced this week exclusively for Computer Weekly readers. Book Input 20-Nine is offering 10 computing books, including the massive Encyclopedia of Computer Science, with 25% discounts. If demand is sufficient the company will start a book club early next year. See page 4.

Briefing

Two firms set up Irish plants

A MANUFACTURING, design and software development centre is to be set up in the Dublin area next year by Computer Automation.

It is expected to employ about 400 people. The Irish Development Authority says that CA will initially use existing industrial premises.

Digital Equipment has announced a second plant in Ireland. This will open next year at Clonmel, County Tipperary, and will employ about 100 people within the first year.

DEC's existing plant at Galway, opened in 1971, now employs 1,000.

Uncommitted

ALTHOUGH ICL is committed to support any internationally agreed communications protocol standards, such as HDLC and X.25, it is not yet prepared to commit itself to any overall networking philosophy.

Oracle halted

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COMPUTERVIEW

Success of the Cross years still to be proved

THE final judgment on the reign of Geoffrey Cross at ICL will depend more on ICL's performance in the next few years than on the successful financial results of the Cross years.

His achievement in turning ICL into an expanding, profitable international company is unquestionable, in terms of the 1972-1977 financial results.

But how superficial and short-term are these results? How much has depended on Cross' financial and managerial ability and how much on a genuine, sound regeneration of the whole company?

Cross' departure at this time seemed so unlikely that, although his concern for his family's health was an important factor in his decision, it is clear that other factors must have weighed on his mind.

His departure took everyone by surprise because he had just signed a new five-year contract, stilling rumours that he felt he had fulfilled his ambitions at ICL. Next month, ICL will announce exceedingly good financial results, and last week the 2850, a potentially highly successful machine, was announced.

Having come through the first few traumatic and often bitter years after joining ICL, his standing within the company was at its peak.

The personal shock with which so many ICL staff received the news of Cross' resignation last Friday was testimony to the remarkable effect that he had on the whole company.

And the concern of so many ICL staff about the effect of his departure on ICL's share price also proved that ICL's policy of selling shares to staff can give a company a very practical sense of corporate identity.

Cross had also become a national figure and his name was continually being mentioned when a national post, such as the head of British Leyland or British Rail, became available. There were also continual rumours that he was being headhunted by commercial companies, such as Ford's.

The worst that his opponents said of him was that he was a short-term financial manipulator, who was boosting ICL's performance so that he could have taken up a share option earlier this year to buy up ICL shares at an attractive rate. But those critics seemed to have been silenced by his recent signing of the five-year contract.

His abrasive management style also created many enemies, particularly at middle management level where, in his early days, he rode roughshod and ruthlessly through any areas which he felt were not meeting his overall objectives.

His departure at the height of his public success will give his critics renewed strength. Which

is why the next year will be crucial in proving whether Cross' reputation will stand the test of time.

Why then did he choose this moment to leave?

The state of his children's health and his inability to control labour relations sufficiently well to turn "excellent" results into "absolutely superb" ones were his publicly stated reasons.

Yet he was aware of both these factors when he signed his five-year contract.

Both these factors could, however, be summarised as disillusionment with Britain, weatherwise and because the social system does not accord with his views of how a modern capitalist state should be run.

Earlier this year he made it clear that he would like to be given a free hand in wage negotiations — provided there was a fair fight. By fair fight, he meant that there should be less "featherbedding" for strikers and those taking industrial action.

Between the lines, he was referring more to this kind of industrial relations context last week than to the specific issues of, say, shop-floor bargaining.

He also made no secret of the fact that he disliked ICL being thought of as a government-supported company. He was also extremely unhappy that ICL's government links inhibited his managerial freedom.

Earlier this year he made it crystal clear that he wanted to take over an American minicomputer manufacturer. It is understood that the three he had in mind were the huge Data General, Prime, and Harris.

But the government and some unions wanted ICL to be involved with a British or European manufacturer.

Significantly, Cross commented last Friday that he hoped that the new managing director, Dr Chris Wilson, could bring to ICL "a greater realisation that the real fight is against IBM, not ourselves."

The statement was made in the context of his comments on industrial relations. But there are still those in ICL — mainly at management levels — who talk of the "American influence" and who see Cross, production and development director Ed Mack and "Mr Fix-It" Brian O'Heron as a kind of mafia brotherhood, imposing an alien style on the "old British ICL".

As Computerview pointed out last week, the internecine technical battles over the B and K operating systems have not yet been fully resolved. In these battles, Cross' backing for the Ed Mack K-biased philosophy was a crucial factor in the technical arguments.

Cross' departure could lead to an inflammation of some of the feuding arguments surrounding these software developments, and possibly to the de-

parture of Mack and Brian O'Heron, who is currently in charge of producing B and K to acceptable customer levels.

One of Dr Wilson's first tasks is to keep the 2800 operating system development on its current path of steady improvement.

Given complete management freedom from having to take into account government guidelines, a more free-enterprise society and a stronger belief in the unity of ICL, Cross might have stayed for a few more years.

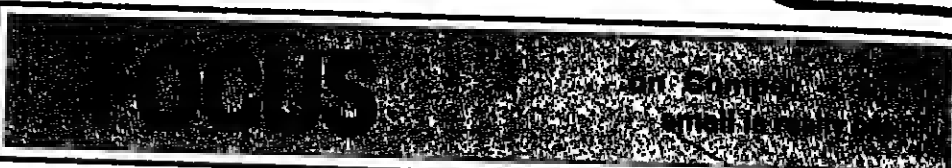
That is now hypothetical. The facts are that ICL and Britain have lost a man they could not afford to lose. And

that Chris Wilson is faced with the daunting task of following in his footsteps.

Dr Wilson is, according to those who have worked with him, a quiet man, of high intelligence and integrity.

His character could be ideally suited to moving ICL into its next phase, where corporate success is visibly seen to be more important than the charismatic man at the top.

Cross always paid tribute to those who worked for him. As he and his family fly off to sunshine and postures new, it is ironic that the best way for his former staff to say "Thank You, Geoff" will be to prove that they can do very well without him.



NOT necessarily all DP managers visiting Compec would have been made happy — in particular, those who cling to the belief that remaining loyal to their mainframe suppliers is the name of the computing game.

The name of the Compec game was very much that of independence from a heavy layer of OEM overall. Traditional computer manufacturers in this environment would have been as out-of-place as a skateboarder at a horse race. Mainframe addicts had to be content with Honeywell which was demonstrating its Level 6 minicomputer range, and Univac which had brought along its intelligent terminals.

The term small was, in fact, limited to the equipment on display. Certainly not either the number of exhibitors or visitors. This was in direct contrast to the recent Datafair and International Business Show where those present seemed very much in the limited category.

It so happens that "small" was also an important finding of a recent UK survey. With almost impeccable timing, the prestigious Henley Centre for Forecasting has presented a survey looking into life up to the year 2002.

Although the project does not specify the role of the data processing manager in 25 years time, it does indicate a growing antipathy towards large scale organisations. Small units will increase in importance. Large corporations will increasingly become partners of the State.

Much of the Henley report is devoted to communication and computers. Changes apparently arrive on the scene more quickly than is generally expected. This, the survey suggests, is both a threat and a promise.

Looking around Compec, much of the future seems to be already with us. Personal computing is but a silicon chip or so away. At the current rate of development, our existing pocket calculators will shortly seem to be in the Atlas mode. Mini/micro technology is light generations away from the IBM 701.

For the visiting DPM, Compec could be worrying. Even so, the most dedicated "think small" DP manager must be troubled that seemingly so many companies are dependent on his custom for their existence. This, in fact, is not always the case.

Many exhibitors were present in the expectation of selling in bulk to the specialist manufacturers or suppliers. Dataproducts, for example, in releasing its new range of thermal printers, agreed that its main

market — at least at present — will be the mini/micro suppliers.

Other exhibitors had combined forces. The named Fungus Computers was in close proximity to the abundant foliage of the Fungus stand and have incorporated the owls being presented at on the nearby Nashua's.

Once again, Modular Technology gave a good display. "Small" can also be a year's presentation kit: out-kitted out as a classic DPMs would have been awarding the gym-nastics present an A+.

Other memory retailers included the smooth nisation of the newly released Buzel time sharing proving how a small or system has more than the traditional machine time operation. The released Harris Synthesizer was likewise proving small is also smooth — 155 VM, was online to the EMI headquarters.

A traditional feature of computer exhibitions is the power failure — however, Compec was no exception. Semaphore Computer was caught in a predicament, demonstrating its Vanguard minicomputer.

EMI Technology, a company within the EMI Group, is planning to enter the data communications equipment market. It has taken on European marketing and manufacturing rights for the Paradyne PIX 11 front-end for IBM 370 systems which first appeared at the US Trade Centre in London at the beginning of the year (CW, January 13).

PIX stands for parallel interface extension, and the teleprocessing routine required for interfacing remote peripherals to IBM 360 and 370 mainframes.

The protocol between PIX 11 and the remote devices is Paradyne's own adaptation of IBM's SDLC. Both bi-synchronous and SDLC devices are supported and supplied by either IBM or Paradyne.

PIX 11 is built round a microcoded processor based on a General Automation chip and a single processor can handle up to 38 Megabaud of traffic. Thereafter, a second micro can be added.

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Ten years ago...

COMPUTER WEEKLY
NOVEMBER 16, 1967
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ICL gets university software for 2900s

FOUR programming languages and a database Furrun interface, all developed by universities, will be available from ICL for its 2900 range within the next year.

The Furrun interface to the IDMS database management system is being developed at Edinburgh University on the 2980 run by the regional computing centre. It will be complete in 1979, but early releases will be made available.

Kent University is preparing Basic on its 2980, running under the VME/K operating system, and an Algol 68 compiler is being developed for the 2980 run at Bath for the south-western universities.

Two products near fruition are Pascal, which is coming from Southampton, and a simulation language, ACSL, being developed at London's

Imperial College.

The products are being developed under the auspices of the four-man committee of representatives of ICL and the Department of Education and Science's Computer Board, which oversees university computing. The committee was set up a year ago (CW, October 7, 1976).

ICL has invested £300,000 in the projects and the Computer Board supplies the computer time.

ICL is already selling one product from a university. This is the Scientific Jobber, developed at Edinburgh to handle small, fast jobs which do not need all the facilities of a full operating system and do not involve a lot of disc access (CW, July 8, 1976).

ICL says the product is very popular and is run by virtually all its scientific users.

Compower enters APL market

ANOTHER bureau service has ventured into the increasingly competitive APL market.

The latest APL service comes from the National Coal Board's subsidiary, Compower. At the same time, it is approaching two other popular areas: relational database and APL-database interface.

Compower last week officially launched the APL service, which has been running in test mode for about 18 months. Most of its users have been within the NCB, but there are at least two outside users, in Birmingham and Widnes.

Like many APL bureaux, Compower sees many of its potential users in the commercial sector, as well as the scientific market for which the language was originally conceived.

Compower's APL is an implementation of IBM's APL/SV on a 370/148. Processing is particularly fast on this machine since the APL support software is partially microcoded.

Compower's "relational" database scheduled for release at the end of next year, is based on the bureau's existing YES/1 database management software. This is fundamentally a multiple-indexed file system, but data description and data management as the user sees it is in terms of a network data structure.

CBE for Burroughs' chairman



RAY MACDONALD, chairman of Burroughs, which has seven plants in the UK, has been awarded the CBE for "outstanding services in furthering Anglo-American relations." MacDonald will be invested in Washington on November 30 by British Ambassador Peter Jay. The CBE is an honour that can be conferred upon non-UK or Commonwealth citizens. MacDonald has been with Burroughs for 44 years. He was made president of the company in 1987 and became chairman in 1973.

PO engineers go back

OVER 1,800 Post Office engineers who staged a two-day walk-out last week are back at work following the reinstatement of 28 of their colleagues.

The 28 engineers at the St. Botolph's international exchange were dismissed for taking action in support of a demand for a "dirty and discomfort" allowance.

Negotiations on the allowance between the Post Office Engineering Union and the Post Office have now resumed.

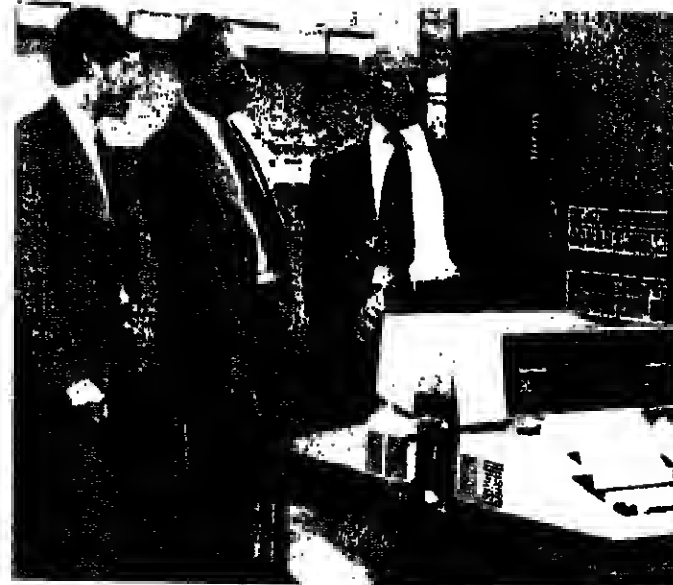
Honeywell wins \$52m US govt contracts

TWO US government contracts worth a total of \$52 million have been won by Honeywell from the Veterans Administration and the Internal Revenue Service.

The US Veterans Administration, which looks after the welfare of ex-servicemen, is spending \$38 million with Honeywell on a comprehensive nationwide computer network which will enable beneficiaries to receive their money within minutes rather than days.

This will be one of the first implementations of Honeywell's Distributed Systems Environment. Involved in the contract are three dual 66/80s, a dual 68/60, more than 100 Level 6/36 minis and hundreds of VDUs.

The contract from the Internal Revenue Service is for 13 of Honeywell's PPS non-impact page printing systems, which have been on offer in the US for a couple of years, but arrived in the UK only two months ago (CW, September 29).



THE command and control system for the West Midlands police (CW, February 3) has entered the final stages of its development with the delivery of the production hardware, a dual Ferranti Argus 7008, to Leasco's offices in Maldenhead, Berks. Leasco has been designing and implementing the system for almost a year, using an Argus 700E.

Ferranti raises £25m loan

FINANCIAL recovery of Ferranti took another step forward last week with the announcement of a £25 million loan from a consortium of banks, which will allow the company to pay back a £6.33 million debt to the NEB and an estimated £9.9 million overdraft. Taking advantage of lower interest rates, Ferranti

will be able to finance the loan at a lower cost than previously, while using the balance after payback to provide working capital. This will no doubt be used to fund continuing developments in electronics and computers where the company feels it has an edge over its competition.

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DOWNTIME

No laughing (gas) matter

A ROBOT designed in defiance of Asimov's First Law of Robotics made its debut at the recent annual seminar of the American Society for Industrial Security, in Florida.

Named Century 1 (nothing to do, I hasten to add, with NCR), it costs \$75,000, is seven feet high, and is programmed "to find and immobilise intruders". Sensors can detect movement, body heat or noise, and then "locks in on you," as Quasar Industries robot expert, Anthony J. Reichelt, put it. Then the stalking begins.

Quasar Industries, of Rutherford, New Jersey, who designed Century 1, says that when the robot gets within about 8ft of an intruder, it instructs the stranger orally to stop. If disobeyed, it gets tough — how tough depends on which of the available op-

tions have been added. Standard equipment includes a high frequency sound generator that can cause extreme pain in the inner ear. Options include a strobe light to blind the intruder temporarily, an electronic gun that delivers a powerful electric shock and a mechanism that releases laughing gas.

Mr Reichelt said that the Royal Bank of Canada, plagued by robberies, had asked if Century 1 could be programmed to kill. He told them it could, but added that his company planned to use only "non-lethal restraint" in the robot.

If you happen to be both an innocent visitor and so deaf you can't hear the robot's challenge, it's presumably your hard luck. If you're blinded, stunned and gassed as well.

Signs of Life?

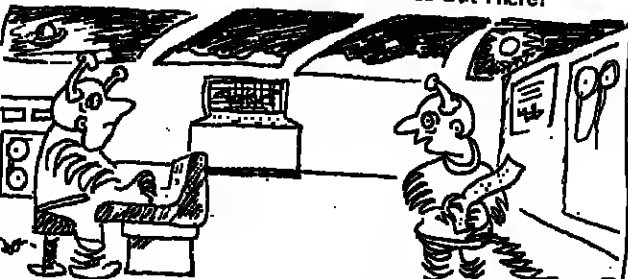
A RECENT discovery, reported in New Scientist on October 13, suggests that there may be many more civilisations in the universe than had been thought. The discovery was made by Dr Robert S. Harrington of the US Naval Observatory, who made a computer analysis in which he "pretended" that the planet Jupiter was a star of the sun's mass.

To his surprise, and that of all upple-lovers too, the analysis indicated that the earth's present orbit was more or less unaffected by the stronger gravitation. The galaxy's uncounted two-star

systems could therefore be suitable for the emergence of life in recognisable form.

The findings have already stimulated new interest in composing radio messages to putative other civilisations (granted that life on Earth is civilised).

Although the transmission of messages which, by the very nature of things, will not be received during the lifetime of the system sending it, is contrary (I hope) to the practice of my readers, I wonder what signal they would compose for the enlightenment of our fellow creatures Out There?



Positive feedback

ON the BBC's Nationwide programme recently a Weather Forecast presenter, faced with a typical forecast as shown on American TV, with its battery of satellite photographs, radar plots and computer predictions, retorted (and showed that, given enough funds, the Met Office could provide viewers with even more in the way of graphics, driven by even more sophisticated computer systems.

And then the other night I heard on the old steam radio that an MP had actually checked the 24-hour weather forecast with reality over some months and found that more often than not they had proved to be inaccurate or, as we say at the bus stop in an unforecast deluge, wrong.

I'm not knocking anyone, but ask in a spirit of pure academic inquiry, whether a similar statistical check has been made on computer horoscopes? Perhaps a manager could be arranged, and Mr Flash (Places) could advise us not only to wear our wellies but to beware of the malign influence of Saturn's presence in our ruling House. I'd still believe him.

Futureviewing...

I WAS surprised to learn that pupils of George Heriot's School, Edinburgh, have been having trouble with maths. The school did, after all, develop, from Heriot's Hospital, founded by James VI and I's pawnbroker/financial adviser, Jingle George.

Now all is well, thanks to the school's use of a computer: the boys, it is reported, "now show a willingness to argue about mathematics, not only with the staff of Edinburgh University's Department of Artificial Intelligence, who are conducting the experiment, but also with Her Majesty's inspectors on their visits to the school."

Completing software projects on time

FOLLOWING the recent publication of Tom Glib's Software Metrics (reviewed CW, September 22), discussion is developing about the realities of measurement of certain aspects of computer systems. Not least of these is the field of estimating the resources required in programming and systems work.

As every competent programmer knows, there is only one sure way of finding out how long a programming task will take and that is to do it. The other, less certain, way is to start estimating. Estimates are usually made conservatively to allow for unforeseen circumstances, but most computer projects seem to over-run on time or cost, or simply fail to meet specification.

There are many examples in the literature — books, magazines and newspapers — of computerisation projects that have ended in disaster. Sometimes the hardware doesn't arrive, sometimes the software. When the software does arrive it is often riddled with bugs. It is not uncommon for a system to take two years from its original delivery date to attain 5% effectiveness. So-called real time systems get installed with response times that render them analogous to jet aircraft taxiing from New York to Los Angeles.

Not all projects fail as miserably as these examples, but in the computer field, estimates are rarely met and almost never reduced. Why is this? Why is there an inexorable trend upwards in time and money costs of software?

The problem lies in the inflexibility of the estimates once they are made. Management likes to keep to its schedules, rather than capitalise on the success of technical people and encourage them to get in front of their timetable.

Many of the time that a young naive engineer or programmer has completed a task early and been castigated for it rather than rewarded. Such people are treated as troublemakers. Not only do they alter the critical path of a project and cause extra work for management in rescheduling the work, but they also discredit the managers who made the original estimate for the task.

Conventionally, the correct course of action is to take about 10-20% more time on a project than was estimated, thereby earning mild retribution from the non-technical management, who can then kid themselves that they have been in control of the project all along. Any spare time found or created by the application of genius must be filled out with artificial pseudo-work which non-technical managers have invented as a much more easily measured activity.

This phenomenon is not restricted to the computer field. It occurs in any work environment where a supervisor is forecast with reality over some months and found that more often than not they had proved to be inaccurate or, as we say at the bus stop in an unforecast deluge, wrong.

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Estimating the resources required in programming and systems work is a difficult art. DICK HALES, who is a freelance trouble-shooter in the field of documentation standards and lectures on data processing, discusses how software projects might be organised to avoid danger areas and encourage efficient completion, with emphasis on proper liaison with user departments.

responsible for work he does not understand. Workers are rewarded for the appearance of work rather than work itself. Such attitudes towards programmers show a high correlation with the type of autocratic management style found in so many large business organisations. This type of management has always been aware of the human element in programming, but has invariably attempted to eliminate it rather than to understand it.

This de-humanising approach is even more dangerous when directed at user departments. The user must be involved right from the start and, when necessary, technical points and their implications must be explained in everyday language.

Summarising, we have four main points which must be emphasised to increase the probability of success for a computer project:

1. Set objectives for each "planning-level" of the project.

2. Involve the user (customer) throughout the project.

3. Treat members of the project team as human beings, allowing them to develop and use diverse skills, and involve them in the planning of their work.

4. Reward people for achieving objectives which are in line with the success of the project, rather than the mere performing

of activities which can degenerate into pseudo-work.

The key to the whole thing is the specification which, to be effective, must serve as a communication link between computer-oriented programmers and the user department or customer organisation.

The gap must be bridged between the computer people who think quantitatively in vague, human terms. We need to prepare a specification which is capable of being understood by both sides.

However, this immediately presents us with another problem. As we delve more into the details we realise we are getting further away from the "perfect specification" which we have come to demand as the starting point of our "guessimating game". But as we have already seen, our conventional estimating procedures tend to encourage over-running of deadlines anyway, so why worry if the specification on which they would normally be based seems to be disappearing into the distance?

Instead, let us follow our line of argument and see where it might lead. If we accept the possibility that the original specification should be subject to negotiated alteration during the life of the project, it becomes conceptually much easier in the initial stages to accept that some

points are still open to discussion and will not be reached until the project has started.

Apart from any other advantages, this approach is realistic. It complies with the facts that the computer people have only a hazy idea of the user's requirements, and that the user's requirements are often changing. It is a pretty funny idea about computers can do.

By encouraging this realistic approach, progress meetings can be welcomed as opportunities for educational and constructive negotiations, while in conventional projects they often degenerate into forums for gladiatorial combat and malicious recrimination.

Developing the theme, the initial specification becomes very much a document for the strategic planning of the project. Identifying milestones which can be tied to progress meetings and laying down guidelines for the discussion and implementation of the tactics to be used at each stage. As the project progresses, the original machine capability grows smaller rather than wider, as is the case in poorly co-ordinated projects.

By encouraging the participation of programmers and designers in the design and management of the project, satisfaction is enhanced, programmer performance is improved and, thus, increasing the possibility that projects will be completed on time and at cost.

"Software Metrics by Tom Glib, 282pp. £11.15. Prentice-Hall International.

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Did the government cause Cross to resign from ICL?

From front page company had looked at some American companies but were not, at this stage, prepared to buy. Cross said that ICL was free from "government interference".

Besides talking about his children's poor health, the only

other reason Cross gave for his departure was that the industrial relations situation at ICL, although better than elsewhere in the country, had meant that ICL results were only "excellent" rather than absolutely superb. He gave his successor, Dr Chris Wilson, the ominous

message that he hoped he would be more successful in proving to ICL that the real competitors were IBM "and not ourselves".

Earlier this year, Cross criticised government policy because he felt the social system was too easy on strikers but did not reward hard work well enough.

Cross' decision to resign took everyone by surprise, particularly as he had only recently signed a five year contract (CW, June 9) at which time he was press conference announcing his resignation but he will not leave the ICL board until the end of the year.

His achievements are obvious for all to see; the changes in organisation and management methods are easy to see from the inside, but less so from the outside. I think they are even more important than the results.

Asked to summarise his own achievements, Cross mentioned first the "super management team" he had put together. The Singer acquisition was good for Britain and good for ICL. Joining Computer Peripherals Inc was important, and I am proud of our profit achievement and our growth overseas, from £50 million in 1972 to £200 million this year.

For the future, Dr Wilson said he considered the services business an important growth area for ICL, particularly in Europe.

"We have 3,500 bureau customers, and that is important. Bureaux are the best salesmen for the 1500 terminal. Training is also important. Growth management is a people problem. We have to recruit, train and develop 1,000 people a year in continental Europe alone."

"Overall, the services business is about 15% of the computer industry, but it is forecast to grow to 22%. Our services business has to grow with it."

Marketing unit for university research

UNIVERSITY research and consultancy services are to be promoted by a marketing organisation set up by Manchester University's Institute of Science and Technology. UMIST Research and Consultancy Services will negotiate contracts with commercial companies and other organisations on behalf of the Institute.

UMIST's contacts with industry date back to 1824, when it was founded. About 12 years ago it set up a Bureau of Industrial Liaison to seek opportunities for collaboration with industry, and it has also set up industrial service units which bring together staff from different disciplines but whose research interests centre on a particular industry.

The latest is a microprocessor engineering unit, which will cover hardware and software development and training for the institute for the industry.

UMIST Research and Consultancy Services has been formed as a central organisation channelling contracts to these different units. It is supported initially by a grant from the Institute but it is expected to become self-financing.

A director has just been appointed. He is Dr Roger Holdom, currently senior lecturer in Industrial microbiology at Strathclyde University.

Digico 'foothold' in Chinese market

AN ORDER from China for a Digico M18E minicomputer is seen by the UK manufacturer as the first foothold in a market which it believes has "massive potential".

The minicomputer is at the heart of a rock magnetometer developed at Newcastle University (CW, September 18, 1976) and ordered by a Chinese government department in Peking for an unnamed installation.

The M18E is being supplied with an analogue-to-digital converter and a Teletype, but no other peripherals.

Digico is supplying spare parts for two years, but the system will be maintained by the Chinese.

Malcolm Bowden, Digico sales manager, said he expected the company would be asked to add to the system within a couple of months. And Digico had already been asked for quotations for a wide range of systems.

"There is massive potential there," he said. "They have their own computers but no knowledge of interfacing or experience of configuring systems."

Digico has added agents in Hong Kong, Thailand and South Africa to its distribution network which already takes in Greece, Turkey, Denmark, Sweden and Norway. All these agents have been appointed in the last year as part of an overseas expansion plan, and in the next year the company expects to do 30% of its business abroad.

Denmark has been the most successful overseas market, with 14 orders since February. Three orders have been taken in South Africa and two in Greece.

The company is taking a responsible attitude towards its agents. "Anyone can appoint an agent," said Bowden. "But we insist that our agents take a £25,000 system and train a number of staff on our equipment. We know that our distributors are committed because they have to invest £100,000 in equipment and training before they start."

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Denmark has been the most successful overseas market, with 14 orders since February. Three orders have been taken in South Africa and two in Greece.

The company is taking a responsible attitude towards its agents. "Anyone can appoint an agent," said Bowden. "But we insist that our agents take a £25,000 system and train a number of staff on our equipment. We know that our distributors are committed because they have to invest £100,000 in equipment and training before they start."

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THE best, single management idea in data processing for the last decade is the Inspection method, developed by Michael Fagan and Rodney Larson of IBM in New York. It took two years for IBM to begin to tell their customers about their experiences with the method (Systems Journal 3/78) and even though they have now begun to spread the good word, not everybody has listened or heard the message. In particular, I hope to reach non-IBM customers with my attempt to awaken interest in the Inspection method.

Inspection is a quality control process. It has been applied to five main phases of system development: high-level design (which includes records, etc.); low-level design (pseudo-code logic planning for each module); program logic coding; test strategy planning; and test case coding. In all of these cases the Inspection is applied BEFORE ANY MACHINE TESTING TAKES PLACE. The objective and the result is to save human manpower, and project time, while improving the quality of the product in relation to its objectives (usually reliability, maintainability, performance).

Inspection is carried out in a series of phases prior to and after the machine testing. There are about four inspectors who are charged with documenting suspected faults in the documents inspected. A fault is any deviation from higher level design specifications or standards. Faults are classified statistically by type (logic error, maintenance, for example), by whether they are Missing, Wrong or Extra, and by degree of seriousness: Minor (cosmetic) or Major (unacceptable).

The resulting statistics are cumulated, and are tagged with data such as who created the documentation, who inspected, and how much time and effort was involved in various stages of the process. The result is that the managers at several levels finally have a fairly sensitive accounting system for design and programming work. In the hands of good managers, this will allow more objective judgment of all organisational and technological changes. The bottom line results of using the inspection method have been impressive. The results have been repeatedly attained at several places within IBM and in outside customer sites.

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Tape library management package from Computer Associates

FOLLOWING the release of its Dynam/D disc-space management software (CW, April 83), Computer Associates has turned its attention to tape files, with a tape library management package known as Dynam/T. The new package will not be released by the company's UK branch until early next year. As with Dynam/D, Computer Associates UK is waiting until the package has a stable user base in the US first.

Dynam/T's most significant capability, according to the developer, is its management of every file on a multi-file, multi-volume set of tapes. When a given file is requested, the software recognises volume identifications on each tape, finds the file on the appropriate volume and positions the start of the file under the read/write head, whichever device it is mounted on.

The package keeps a log of exceptional events and can generate reports on all tape activity. It releases devices quickly for use by another partition and provides automatic release of sort work files. At the same time Johnson Systems, whose Job Accounting Report System (Jars) is marketed in the UK by Computer Associates UK, has founded a European support centre in Brussels. The aim is to strengthen liaison between the UK and its European agents.

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SOFTWARE FILE

The softer side of Compec

ALTHOUGH Compec is, first and foremost, a hardware exhibition, the increasing importance of ready-made software to the user was evident this year. Although Pansophic Systems was the only company appearing under the classification "software" in the Compec catalogue, a number of other companies made software a prominent part of their display, showing both their own packages and some produced by other companies for their machines.

Prominent on the Prime stand, for example, was consultancy Wooton Jeffreys, which fielded its own representative, promoting its text processing system, implemented on the Prime 300 minicomputer.

An unusual characteristic of the Wooton Jeffreys system is that it does not necessarily treat all data identically as part of a character string. Numerical data included in documents is often part of the program logic in that installation. Wooton Jeffreys allows such information to be passed direct from the document to these programs.

Prime also demonstrated the capabilities of its mini through the CAD Centre's Gino-F graphics package, which was producing three-dimensional drawings at a terminal on the stand. On its own behalf, Prime was showing its Midas multiple-indexed filing system, entering and retrieving details of visitors to the stand.

The Pactal consultancy devoted most of its stand to a demonstration of the MicroSim program development system for microprocessors, which it developed in collaboration with consultants D. M. England and Partners. Pactal is about to conclude a sale of several MicroSim systems to its first overseas customer, in Scandinavia.

MicroSim has been implemented initially on the DEC PDP-11, to produce assembly programs for the Intel 8080, but extension to other source machines, other micros and other languages is planned. MicroSim compiles a program line-by-line, as it is entered, pointing out errors. The program can then be run in a simulated micro, or sent down a

line to a real micro, for testing. A particular feature is the detection of attempts to execute a data field or address. The final program is output in binary loader format, ready-linked, on paper tape. Intel 8080-based M-100 micro-processor configuration, gave prominence to the Modular Accounting Package (MAP). This includes, on the one hand, a sales ledger program, with purchase and nominal ledger to come, and, on the other, an inventory management system. Also planned for future release is a payroll package.

Software formed a minor exhibit on most other stands, but was, nevertheless, an effective demonstration tool for companies showing processors. Data General showed its ANSI 1974 Cobol in interactive mode

to demonstrate the CS commercial system.

At the other end of the capability of the MITS multi-user Basic expected to reach the UK in Compec soon. This was followed by a multi-user access Basic, allowing users to work with the program.

Judging from the expressed by visitors to software companies, Pansophic certainly occupies a choice position as the software representative. UK managing director Dunn contended that being exception among rooms of hardware companies is off in attracting more visitors to the stand.

CAP's first packages for Extel Micro-File system

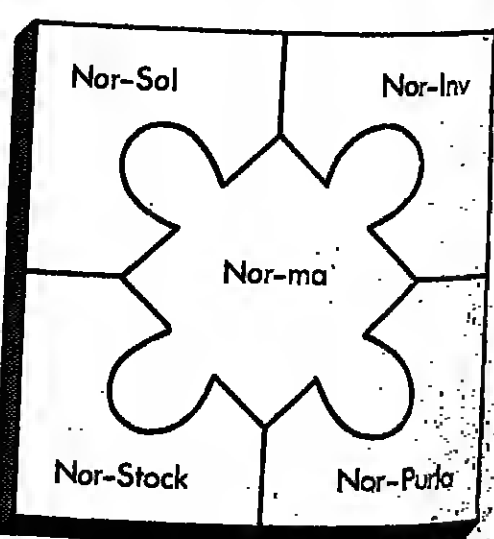
FIRST instalment of a CAP software development for the Extel Micro-File system shows that interest in microprocessors is not confined to the company's Microsim division. The development is in the hands of CAP's General Projects group, in Reading.

The packages available now are designed to handle invoicing and sales ledger, but a wide range of accounting software is planned, under the generic name Capstar. Payroll will be the next application to be approached.

The suite will include implemented on the Extel Micro-File (CW, April 1978). Implementations of microsim will be considered. Micro-File suite has been limited.

At present the invoice sales ledger programs are available from CAP or Extel. Extel marketing agents are still to be settled. The price is at £1,000, and Micro-File system itself supporting software, £8,000.

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EDITED BY STEPHEN BELL

Coral 66 compiler for F100 now in use

THE expected Coral 66 compiler for the Ferranti F100L micro-processor has been completed, by Systems Designers Ltd. The compiler, an implementation of SDL's portable Coral project, is already in use within Ferranti, and will be provided to its first customers soon.

The initial implementation is a cross compiler, running on the ICL 1900 series. A resident version should be released by next April to run on the F100L Development System. Other cross compilers will be released as required, says SDL. Since the compiler is written in Coral, it should be easily transferred on to any machine with a resident Coral compiler.

The F100L Development System, now being produced by Ferranti, includes twin floppy discs, operating system, resident assembler and linker, text editor and debugger package. Provision of Coral will make the F100L the only 16-bit micro offering the language, SDL claims.

The compiler includes SDL's standard program development aids, as provided with the other implementations. An additional facility enables the user to describe within the source program a variety of system characteristics, such as the proportion of read-only and random access memory.

RTL/2 marketing drive in the US

WITH the number of major users of ICL's RTL/2 language in the UK and Europe rapidly increasing, the language's marketing agent, SPL International, is set for a big RTL/2 marketing drive in the US, with the help of its Inspec connections (CW, October 13).

Agreement with Inspec on an outlet for the language is not yet finalised, an SPL spokesman emphasised, but the company is "fairly optimistic" about an early conclusion.

If all goes according to plan, SPL will operate through Inspec's

office in New York from the beginning of next year. It will market a range of products and services, but RTL/2 will spearhead the effort.

SPL has previously operated in the US, both on its own behalf and as a subcontractor to other companies, but has not previously had a permanent US base. There are users of RTL/2 in the US, the company confirmed, but names cannot yet be disclosed.

When RTL/2 first became generally available, it was widely taken up by a rival to the UK government approved real time language, Coral 66.

This rivalry has since moderated a good deal. For example, a Ministry of Defence installation at RAF Seaforth uses the language (CW, June 3, 1976). If the National Enterprise Board's export venture decides to handle RTL/2, it will be another sign of this trend.

A number of well-known UK names have joined the ranks of RTL/2 users over the past six months, and some of these have just been disclosed by SPL. Many will also be using the language in projects on the Continent. In the forefront are GEC's process control division and Plessey. GEC is to use the language in process control

configurations based on the Digital Equipment PDP-11. The division will also use SPL's Multi Task System (MTS) operating software, but some of its configurations will be based on GEC's own RSX-11.

Information on Plessey's use of the language is lacking at present. The company confines itself to stating that RTL/2 will be used "in a wide range of systems using PDP-11s".

Aircraft manufacturers Hawker Siddeley is using RTL/2 to develop software to support a PDP-11-based network carrying aircraft design applications.

Other new users include Courtauld, with an automatic weighing system controlled by Computer Automation Alpha LSI-2s, and Racal, with PDP-11s in an undisclosed application.

Two more UK users for IDMS

ANOTHER two major UK users have been added for Cullinane's IDMS database management system, bringing the number of UK IDMS users on IBM machines to 13. The latest installations are the Corporation of Lloyd's and process control instrument manufacturer Taylor Instrument.

Lloyd's is using IDMS for its control accounting system, primarily involving the processing of insurance premium and claim payments between Lloyd's underwriters and brokers, and the provision of statistics. The software will be implemented on Lloyd's IBM 370/135 and 145 mainframes.

Taylor Instrument will put IDMS on its IBM 370/128, to handle bill-of-materials applications and to interface with a material requirements planning package. All IDMS users on IBM machines in the UK have acquired the package through Sicon.

Fujitsu starts selling Aim

AFTER four years' development, Fujitsu has begun to provide its users with an integrated data communications and database management system. Known as Aim (Advanced Information Manager), it is at present provided for the larger models of Fujitsu's Facom M series. Work is in progress on transferring the software to the

smaller models of the series. Experimental users of the Aim software include the Bank of Tokyo, the Matsushita Electrical Works, and 18 other installations. The price of Aim is comparatively low for database/data communications software, at between 100,000 and 300,000 Yen (\$384 to \$1,153).

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PEOPLE

Entries invited for Export Year Awards

SUBMISSIONS for Export Year Awards from companies and employees are invited by the sponsors of Export Year, which include the British Overseas Trade Board, the CBI and the Association of British Chambers of Commerce.

The awards will be presented by HRH the Duke of Kent, Patron of the Year and vice-chairman of the BOTB, at the Export Year Conference. The Duke, who will be chairman of the judging panel, is also a patron of the BCS.

Over 2,500 companies, including

GEC-Elit, UCC Computer Instrumentation, Rediffon and STC, are taking part in the Export Year, which is an attempt to boost exports by involving the shop floor in export matters.

The judges will be looking for contributions which have encouraged greater understanding of the part played by everyone in the company's export effort. Companies are asked to submit Export Year display material and publications, while employees can submit any contributions they have made.

Trophies will be presented to winning companies, and prizes of £200, £150 and £100 to employees.

The Conference is to take place at the Metropole Hotel, National Exhibition Centre, Birmingham on January 24. Deadline for applications is December 31, and full details can be obtained from the Export Year Office, British Overseas Trade Board, 1 Victoria Street, London SW1H 0ET, tel: 01-215 5180/8383.

Ian Pucknell, former inside sales engineer with GEC at Burgess Hill, has joined Amplicon as sales office manager.

Reg Medlock, technical director of the George Kent group, has retired after 42 years with the company, but his services will still be available on a technical consultancy basis.

London office for Geest Computer

A LONDON office has been established by Geest Computer Services to provide support to its Birmingham, Cambridge and Peterborough bureaux, and Birmingham-based Geest Minicomputer Systems.

The address is: Room 8, London Fruit Exchange, Brushfield Street, London E1 6EB, tel: 01-247 2438. Terry de Laney, who joins Cambridge Computer Services as a salesman from BOC Datastore, will be based at the new office.

Cheques on view

OUR picture shows Jimmy Tarbuck, representing the Prince of Wales (part of the Jubilee Fund) and Nerye Hughes for the Prince of Wales Committee, with cheques totalling £7,000 presented to them by Sir Alf Ramsey. The money was raised by Violonhira, the TV rental company, when they sponsored the 1986 World Cup Commemorative and Royal Jubilee International five-a-side football tournament.

The presentation was made at the opening of Violonhira's new computer and admin centre, Electronic House, in Preston, Lancs. About one million rental accounts are handled at the centre by an ICL 19037, with Violonhira branches throughout the country online. Also seen are (left to right) Kevin Johnson, MD of Violonhira, Kenneth Voletanholme and Sir Alf Ramsey.



SPSS Users' Group to be formed

A MEETING to launch a users' group for SPSS, the Statistical Package for the Social Sciences, will be held on February 8 in London at 2.00 pm. The package is the most widely used in the UK for survey analysis, both for academic and local government surveys, and in teaching at undergraduate and postgraduate level. All users and potential users of SPSS are invited to attend. It is hoped that subgroups may be set up, for teaching, research, admin, etc, and anyone prepared to help in this should contact John Hall on 01-607 2780, ext 5029.

Ray Spence has left the Burton group, where he was director of computer services, to take the newly-created position of data processing manager with Courage's management services department.

Derrick Masters, Mike Parri-Hughes and Maggie Drewery have joined Mahavik Data Sciences as sales executives in the Southern region. Masters joins from CMC, where he was a technical support analyst, Parri-Hughes from Rediffon, where he was a sales executive, and Drewery, a former analyst-programmer, from ACS.

Robert Hall has joined Amdahl UK as systems support manager, from IBM UK where he was systems engineering manager.

James Aky, director of Liverpool University's computer laboratory, becomes chairman of the Merseyside branch of the BCS.

T. Eugene Smith has become vice-president and general manager of Perfec's microsystems division in Los Angeles. He was formerly president of Loftis Engineering, and before that held several consecutive vice-presidential positions with Texas Instruments.

He succeeds J. David Callan, who becomes assistant to the group officer, with responsibility for evaluating new business developments and product line expansions for the Perfec division and the microsystems division.

Alan Lloyd has joined Wright Air Conditioning to become director and general manager of the new Bristol subsidiary, Ken Dalton joins the parent company as sales director. He was formerly an executive with Oscar Faber and Partners, an engineering consultancy.

Top marks in BCS Exams

TOP performers in the BCS Exams Parts I and II, will receive £75 each at the Annual Dinner on December 12, Imperial College, London. Basil de Ferranti will present the prizes to Paul Seligman, a programmer at the University of Cambridge, and a systems programmer at the NPL. Guest speaker at the dinner will be Sir Brian Flowers, rector of the College. A few tickets are available (£17 double, £9.50; and can be reserved by phoning Hinc on 01-222 4104).

DIARY

NOVEMBER 21 Computer-aided cost estimation, discussion meeting, Institution of Electrical Engineers, IEE, Savoy Place, London WC2 1LB.

Mechanics-aided synthesis of rules of thumb, Edinburgh University Machine Intelligence Research Unit, Hume Tower, Osney Square, Edinburgh, 17.15.

NOVEMBER 22 Meet the members - inaugural meeting, DPMA, Sussex branch, 18A Chapel Road, Worthing, Sussex, 18.30. Contact: A. Kassam, tel: Worthing 34735.

How well does a manager manage? Brian Beetham, Data Processing Management Association, Builders' Exchange Club, Sheffield, 18.00.

A systems approach to pictorial pattern recognition - lecture series, Morton Muller, Machine Intelligence Research Unit, Chess Lab, MIRU, University of Edinburgh, 10.30.

NOVEMBER 22-23 Structured program development, John Parker, BCS, London branch, London. Details and registration through BCS, 01-637 0471.

NOVEMBER 23-24 Programmable Instruments conference, IERE / IEE / IQA / BCS, National Physical Laboratory, Teddington, Middlesex, IERE Conference Secretariat, tel: 01-388 3071.

NOVEMBER 23 Running a group computer facility, DPMA, Central London branch, Control Data Institute, 77 Wells Street, London W1 1BB.

Applications of interpretative high-level languages, discussion meeting, Institution of Electrical Engineers/BCS, IEE, Savoy Place, London WC2 1LB.

Array and vector processors, P. Gray, BCS, North Staffs branch, Computer Centre, University of Keele, 20.00.

Multicriteria programming for financial planning, Dr D. J. Ashton, BCS Mathematical programming group, London School of Economics, London WC2 1LB.

Software for computer graphics, Dr R. M. Williamson, D. Rasmiller, H. Quillam, BCS Display Group, City University, London EC1 1AB.

Microprocessors, R. Brunsell, BCS, Teesside branch, Teesside Polytechnic, Middlesbrough, 18.00.

The present and future for computer peripheral technology, S. O'Connell, BCS, Edinburgh branch, Mountbatten Bldg, Heriot Watt University, Edinburgh, 17.30.

UNIVAC Series 90 Users' Association, conference, Selfridge Hotel, London W1 1000.

NOVEMBER 24 Computers in action, BCS Medical (Scotland) Group, The medical school, Ninewells Hospital, Dundee, 11.00. Details: D. L. Simpson, tel: 041-339 8822, ext. 73.

System 10, its place in ICL's range and its capabilities, Alan Wakefield, BCS, South Wales branch, Students' Union, Park Place, Cardiff, 18.00.

NOVEMBER 24-25 Meeting IBM Computer Users' Association Programming Group, Grand Hotel, Bristol.

NOVEMBER 28 Proving chess strategies correct, Edinburgh University Machine Intelligence Research Unit, Hume Tower, George Square, Edinburgh, 17.15.

NOVEMBER 28-30 Managers, databases and information systems conference, IFIP/AG, Amsterdam.

NOVEMBER 28-DECEMBER 2 Automatic testing and IEE/IEE conference, Metropole Convention Centre, Brighton.

NOVEMBER 29 A year's change, Philip Hughes, BCS, ACM Chapter, Polytechnic of Central London, London W1 1B, 18.30.

A review of do-it-yourself computing, Dr M. Healey, Institution of Electrical Engineers, IEE, Savoy Place, London WC2 1LB.

Development and exploitation of programmable automation, symposium, IEE/MechE Institution of Mechanical Engineers, London SW1.

Computing in Hospitals, Dr E. C. Coles, Data Processing Management Association, West of London to Oxford branch, The Bull, Gerrards Cross, 18.45.

NOVEMBER 30 Management Education Seminar, Research Unit, Hume Tower, George Square, Edinburgh, 17.15.

NOVEMBER 30-DECEMBER 1 British activity in online information services, David Martin, Dr Philip R. BCS Information Retrieval Group, University, London EC1 4JQ. Tel: £1.00 from Information Retrieval Group, Science, 01-640 5599.

NOVEMBER 30-DECEMBER 1 Meeting, IBM Computer Users' Association Local Authorities Group, City Hall, Wakefield, Yorks.

DECEMBER 1 Pattern-based chess knowledge and machines, D. Middle, Edinburgh University MIRU, James Clerk Maxwell Building, 17.15.

Who needs cash anyway? J. H. Lapp, BCS, Oxford branch, County Council Staff Restaurant, Paradise Street, Oxford, 18.45.

Ceefax, what it does and how to use it, BCS Chapter and N Wales branch, Hotel, Chester, 18.30.

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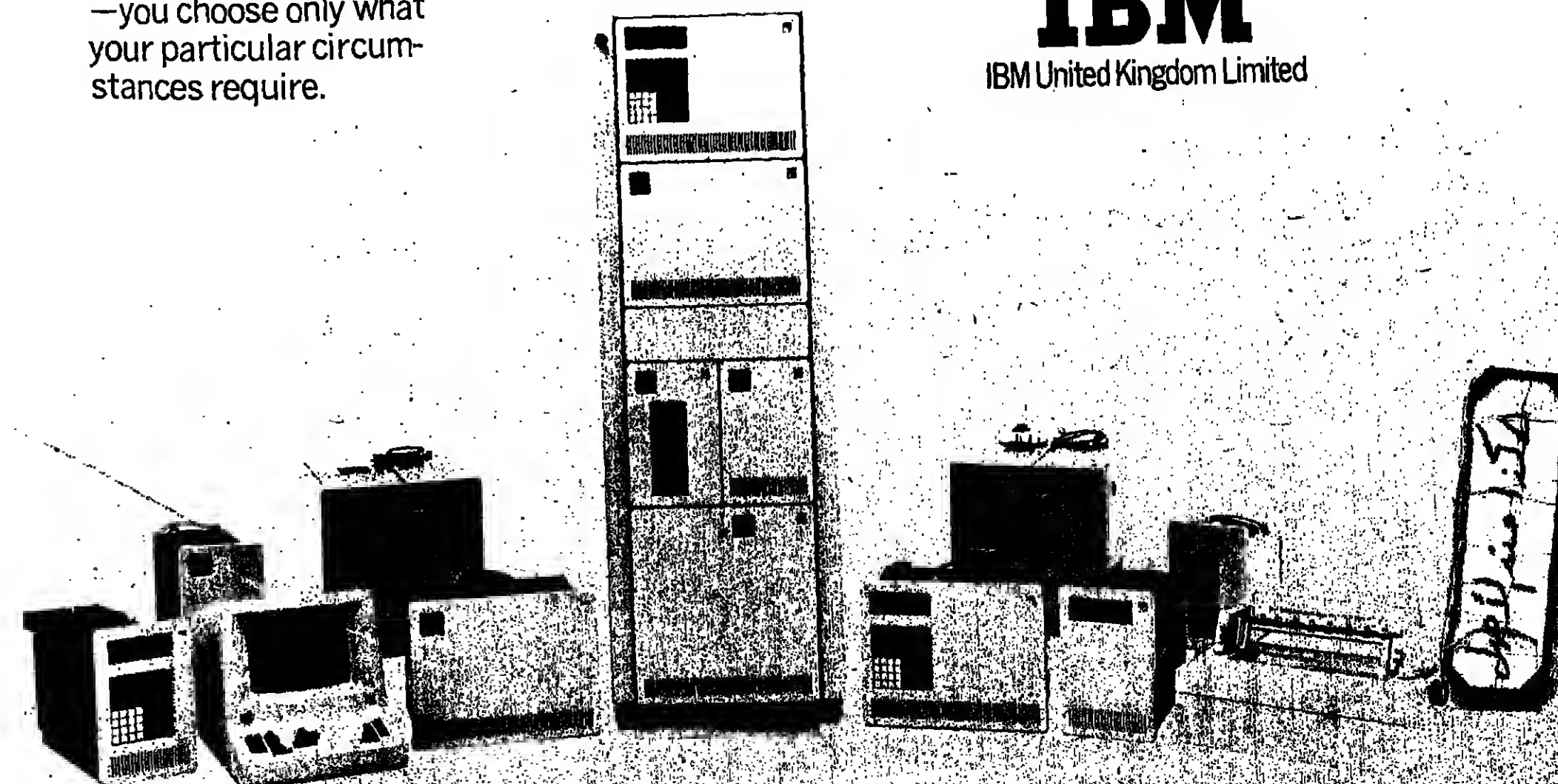
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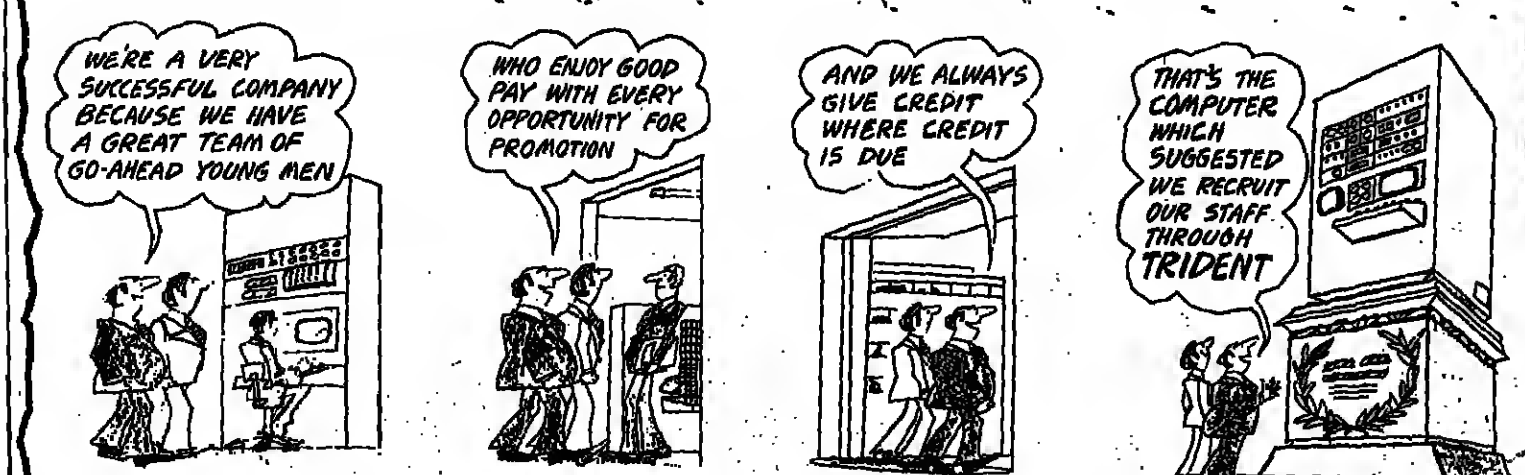
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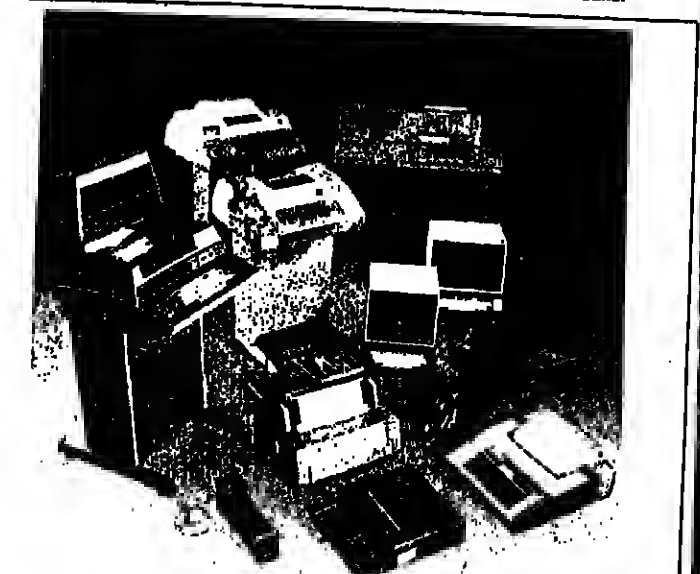
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COMPEC 77



Above: Looking suspiciously like John McNulty, boss of Modular Technology, is Mr J. McNulty, who took a stand at Compec to present an idea's guide to date communications. Trying not to look too dim are two of St Baudet's gymknaped myrmidons, and readers could be forgiven for mistaking the bearded youth for Nicholas Comfort, John McNulty's right hand man.

RIGHT: A complete contrast to the pure hell of St Baudet's was the cool laity elegance of the Fungus stand, where most of the gals were of a non-nonsense businesslike nature — mainly hard talk about the range of DEC oriented systems and peripherals that Fungus builds and sells.



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Package Programs Limited

Launch-pad for UK products

A SIGNIFICANT feature of Compec was the emergence of several new all-British products introduced by small independent companies without benefit of government money. Perhaps the most striking was the elegantly-styled all-black VDU from Pericom. Built around the company's Milton Keynes plant.

"We thought there was room for another UK company making VDUs, particularly at the top end of the market," Ron Cragg, head of Pericom, told Computer Weekly.

"I was very impressed with the stylish French Sintra VDU, which seemed to be featured on almost every other stand at SICOB last year, and I wanted something with nice styling.

"I think we have achieved that, and that overall the 6801 is a strong product. It is not programmable, but it offers all the normal features one expects in a VDU. In particular there is a double page memory for scrolling. It has a true lower-case character set, and we have a strong printer package which enables one of the pages to be used for buffering up printer protocols. And it is completely operator configurable.

"Markets we are aiming at include word-processing and business systems, and the 6801 is available in pre-production quantities now; full production begins February 1."

New from Computer Aided Systems (Sales), specialists in selling commercial systems based on DEC minis, is an all-British business system with its own specially developed programming language. Called Compass, the system has a processor built around one to three Zilog Z80 micros, and includes discs and printers from DRI and VDUs from Cifer.

A fully-configured system supports up to eight VDUs, takes 192K-bytes of main memory, and is programmable in Basic, machine-code and the proprietary CABL language.

CABL was developed by pro-

grammers familiar with Cobol and Dobil, and is akin to languages but has features "never before available in a machine of this size" according to the company.

"The response at Compec has been fantastic," a spokesman told Computer Weekly. "We want to market it, particularly in the North of England and Scotland, and there has been considerable interest from government and other large organisations with their own mainframes have been impressed at what can be done in a system of this size."

The basic system consists of the processor with 32K-bytes memory, full-size VDU, 150Kbyte disc drives and 150Kbyte printer, built into a specially-designed 800mm-deck, and sells for £17,500.

The processor was developed by another British company, Trivector Systems of Huddersfield, and was exhibited by the company as the Triton 1.

The interconnection between the Z80s is via a high-speed triprocessor link; each has its own dedicated memory of 128K-bytes, and there is a 64K scratchpad memory attached to the bus and shared by all the processors.

Micro firms merge

ONE of the UK's home-grown microcomputer manufacturers, Bear Microcomputer Systems of Maldenhead, shared a stand at Compec 77 with Newbury Laboratories — mainly because the two firms are merging at the end of the year.

They plan to open a hobbyist shop at Newbury's premises at Bane Lane, Newbury, and the linking of Newbury's display expertise with Bear's microprocessor hardware/software skills has already produced two interesting offshoots which they showed at Wembley.

One was Micro-Vid, an alpha-numerical output display that can hang on to the bus of any 8-bit microprocessor. Micro-Vid came

with a DMA controller and a 10-inch display that can show eight lines of 94 characters, but its most interesting feature is probably its price — £180.

The other product is a 1480 personal machine incorporating Micro-Vid and configured with a Motorola 6800. The machine came with an integral keyboard and is housed in a rugged casing described by Bear as "budget proof". The user is provided with 4K bytes of RAM and the machine can be interfaced with an audio cassette recorder fitted with a 300 baud Kenaco City interface. This converts digital data to audio tones and was demonstrated in the US at Byte Magazine conference in Kansas City.

MICRO NEWS FROM COMPEC

Package for users of Altair systems

APPLICATIONS software for Altair 8800-based small business systems can now be realised with little in-depth knowledge of software and programming, following the introduction of the Intra-User software package by Computer Sense.

The package uses a conversational mode to extract from the user a definition of the files to be originated in the system, the information to be held in each file, the characteristics of each data field, and the rules to be applied in processing them. The software then assists the user to define the format and contents of each printed report which is required from the system. Special functions that are repeated regularly can be assigned a reference number once specified, so as to remove the need to specify the function in detail every time it is required.

The conversational interaction built into the software means that a user can generate an applications package tailored to his own requirements with considerable ease. It also means that once created, the program can be altered to suit new requirements in the same way as it was created.

Computer Sense has quoted a unit of two and a half hours for one customer to create a VAT accounting module as an example of the speed of implementation of the software, which is available for £30.

Music making with Model 6

FOR the musically minded, Comat of St Neots, Cambridgeshire, has added the Model 6 music board from Newtech Computer Systems Inc of Brooklyn, New York, to its range of £100 bus compatible microcomputer products.

The board utilises a 9-bit latching digital-to-analogue converter to produce melodies, rhythms, sound effects and the like, from programs written in Basic.

It comes complete with its own in-built audio amplifier and speaker, and is equipped with a jack socket for connection to an external audio system.

A users' manual which contains instructions for writing the Basic programs, and an 8080 assembly language routine for playing them, is provided.

Compatible with the £100 bus structure, the Newtech board joins the range of "personal" computer products handled by Comat on a retail and mail order basis. These include Cromemco, Imast, North Star, Dynabyte and Franklin systems.

Extending Micro-File capability

TO meet a growing demand for extended capabilities for the Micro-File microcomputer system, Extel's Engineering Division has produced a combined hardware and software package that doubles the number of terminals that can be used with the system from two to four.

Aiming primarily at the small to medium scale business user, the Micro-File multi-terminal access package enables four operators to use the system simultaneously. The additional terminal ports are located in a small module that fits on to the back of the standard Micro-File cabinet, and each port is equipped with an RS232C interface which allows each terminal to be independently selected for speed, parity and function.

Mycron products introduced into UK

MICROCOMPUTER boards and systems from Norwegian manufacturer, A/S Mycron have now been introduced into this country by Euro Electronic Instruments. The product range extends from a complete Intel 8080-based microcomputer system with dual floppy disc drive, through to a full range of CPU, memory and interface boards. It also includes a range of software products that extends from a one-pass assembler through to a sequential Pascal compiler.

Based on its own board products, the microcomputer system utilises a chassis unit which incorporates its own power supply. In its basic form, it can accommodate up to six double size Eurocoms, and incorporates a backplane interconnection motherboard.

Any of Mycron's board-based sub-systems can be used to realise a particular system configuration. These range from an 8080 CPU that includes 1K of RAM, 2K of EPROM, UART channel, bus interface and 2MHz clock output, through a selection of memory cards that include 4K byte static RAM, 16K byte dynamic RAM, 8K byte EPROM, and 64K byte of dynamic RAM, and on to a variety of interface boards that cover such requirements as dual serial I/O, 4 channel serial I/O, two input and output parallel I/O, floppy disc controller, digital input and output modules and analogue input and output modules.

The range also includes a special high speed slave CPU board based on AMD 2901, 4-bit, bit slice devices. This is configured as a general purpose 32 bit microprogrammable module, featuring a 200 nanosecond instruction time, hardware floating point arithmetic, and a 512 by 32 bit word EPROM microprogram memory.

A wide range of software packages is also available from Mycron. The one-pass assembler is designed to be a debugging aid for interactive use, allowing error recovery to be made both during and after actual assembly. It resides in less than 4K bytes, and is broadly compatible with the Intellec-8 Mod 80 assembler.

Other software includes a diskette based monitor, two floating point packages, a text editor, a real time and time sharing monitor, a PL/Micro resident compiler that is compatible with Intel's PL/M, a sequential Pascal compiler, which provides simple and structured statements, constants and data type definitions and entire and component variables declarations.

This extension of Micro-File's capabilities is the first development of the system to be engineered by Extel, which imports the system from the US manufacturer, Data Terminal and Communications of Campbell, California. The hardware is based on an Intel 8080 microprocessor, with up to 64K bytes of internal read/write memory. Versions are produced with either two or four floppy disc drives and a variety of software applications packages, including sales ledger and stock control systems, is available.

The company has its headquarters in Oslo and employs only 24 people. It has scored significant successes in the oil exploration business, notably a contract from Siemens for 80 systems used in data collection on oil rigs. Reliability was the reason the Mycron systems were chosen, according to a company spokesman.

Founded by Lars Monrad Krohn, who also founded Norwegian minilinkers Norsk Data A/S, Mycron had a turnover of four million Norwegian Krone (2400,000) last year.

Board assembly is all contracted out, although final testing has to be done in-house. Despite its small size, the company has done business in Scandinavia, the US, Canada and Europe. Application areas for which systems have been sold include train supervision in Ca-

nada, hospital patient administration, laboratory automation and education.

For the future, Mycron is waiting impatiently for the Intel 8086 16-bit micro, but if the 8088 is delayed much longer, may adopt instead the Zilog Z80. The plan is to produce a faster and more comprehensive CPU board as an upgrade for the Mycron 1 CPU board. There is also a fast input/output processor on its way, based on the Z80.

The company was founded on the twin philosophies that hardware is cheap, software expensive, and that the right person to write process control applications is the process engineer and not an applications programmer. Thus, says Mycron, he needs software tools simple enough that he can program easily, and that is what the company believes it offers.

Edited by Martin Banks

Self-study course

THE self-study microcomputer training course produced by Integrated Computer Systems is now being handled in the UK on an exclusive basis by Computer Marketing.

The course, which costs £349, is claimed to be the first to have provided a self-study programme giving hands-on experience of both hardware and software. It consists of a fully assembled Intel 8080 microcomputer card that contains an educational monitor program.

This is combined with a 850 page work book, which covers topics such as hardware fundamentals, a step by step introduction to the 8080 Instruction

set, use of the hardware's built-in keyboard and display for program loading and checking, programming for serial and parallel input/output, real time program design, peripheral interfacing and working with advanced mathematical routines.

The exercises covered by the course range from simple routines to illustrate the instruction set, through program debugging problems and solutions to advanced programming techniques.

Computer Marketing, based in Essex, has come to an agreement with Midleton, of Belper, Derby, for sales coverage in the North of England.

Plessey memory unit

A MEMORY device intended for use with software programmable keyboards has been introduced by Plessey Semiconductor that has the capability to provide up to 380 10-bit outputs.

Called the MP 3802, the device is a read-only memory capable of encoding a total of 90 single pole, single throw key closures into a 10-bit code. Each key can

also have up to four selectable modes.

It is suitable for operation with DC or analogue keys, and data outputs and control inputs are compatible with TTL, CMOS and most other logic families. A variety of customer options can be provided with the device.

All the well known data transmission codes can be used.

CA-SORT

March 1976: 500 Sept. 1976: 900
Sept. 1977: 20000

On the 31st of August this year we installed our 2000th CA-SORT. As it happens, it was at Belgium Shell which operates an IBM 370/138 running under DOS/VS.

We can only guess at how many independent packages designed for 360/370 computers have ever reached this exceptional figure — perhaps 10 or so?

But whatever the number — the reasons for getting there were undoubtedly the same: a uniquely designed package with superior performance, fewer problems and better

technical support.

Enhanced regularly over the years, CA-SORT is now honed to near perfection. With Release 5.0, announced recently, it now runs faster and uses less resources than ever before.

Literally thousands of users in 28 countries around the world have been able to stretch limited hardware budgets through savings with CA-SORT.

Isn't it time for you to consider CA-SORT for your centre? Find out for yourself why over 2000 IBM users have already switched from other sorts.

You can evaluate CA-SORT on your system for 14 days without obligation. It takes a mere 10 minutes to install — even less on OS systems — and without any interruption to work whatsoever.

Fill out the coupon today — or call your nearest CA representative for prompt action. You, your programmer — and especially your comptroller — will be glad you did.

COMPUTER ASSOCIATES

DATAPRO, a well-known American research organization, conducts a survey each year to determine the most valued software packages in use in the USA. To our knowledge, CA-SORT 77, a true-time winner, is the only European package to achieve this coveted award.

David T. H. Associates (UK) Ltd.
Park House
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Tel: 06280 30310



Office 1034

Fred Lamond looks at ICL's mainframe strategy

The ICL 2950 completes the 2900 series in the manner of a keyhole in an arch in that it enables the various models to support each other. It links the small 2903/2904 machines, first announced in April, 1973, with the large 2900 models, which were introduced in November, 1974. It also replaces the last of the 1980 vintage 1900 series processors in the ICL product line.

This is a good time to take a look at the 2900 series and see how it compares with its main competitors on the British and European markets. These include IBM's System 32, 34 and 36, the 370, and the 3030; Honeywell's Series 90; and Univac's Series 90 and 1100.

ICL now offers a complete range of modems and

THE danger of any break in upward compatibility in the middle of a manufacturer's product range is that it "unlocks" his users from their commitment to his products arising out of their past applications software investments. Placed in a position of having to convert their source programs in order to grow, users feel free to play the market and look at competitors' offerings.

This danger is especially great when the break in source program upward compatibility coincides with the transition from one mainframe model to the next. Most of the users lost by IBM have been those who had outgrown the largest of the System 3 models then available, or users who had outgrown DOS and were daunted by the conversion to OS.

Univac lost a lot of ex-RCA users in 1972-1975 when it tried to convert them to the 1100 series, and ICL lost a number of large 1800 series users to Honeywell and Univac before the 2800 DME announcement last April (CW, April 21). Easing the transition for users is thus an elementary defence of the customer base for any manufacturer.

ICL has felt debarred, however, from adopting either of the methods used in similar circumstances by Univac and Honeywell. Univac has dropped its attempt to convert its byte-oriented Series 70 or 80 users to the 36-bit word Series 1100, but has allowed its two mainframe series to pass each other like ships in the night. Series 90 has grown upwards to IBM 370/158 price-performance level with the 90/60, Series 1100 descending to IBM 370/138 price level with the 1100/10, both announced in 1976. Each of the two Univac series has its own operating systems.

ICL feels that the 18-bit address length of its 1800-series compatible 24-bit word DME systems must limit their user programs, and therefore, system sizes, to a maximum of 256K words = 1M bytes. Beyond that, the only possible growth path can be either of the two byte-oriented 2900 series Native Mode systems VME/K or VME/B.

This is not quite as self-evident when one considers that a much more constraining 16-bit address length has not prevented Digital Equipment from growing its PDP-11 bytes.

In both of these cases memory beyond 128K bytes are partitioned to hold a number of real time transaction processing programs side by side, so that program context switching takes place in microseconds instead of tens of milliseconds.

This is a solution that ICL might yet adopt for its DME users, but only if a sufficiently large number of them insist on it. For the time being, ICL advises all users requiring a system with more than 1M byte to convert to VME/K or VME/B.

It is even more difficult for ICL to extend the byte-oriented Native Mode 2900 series downwards, because of VME/K and VME/B main memory requirements. At present, VME/K requires a minimum 768K byte main memory, but ICL hopes to squeeze it into 512K bytes during 1978. Smaller than this it will not go, and ICL has no intention of writing yet a third 2900 Native Mode operating system.

So it is only as falling memory

1970s designed processors, form the small 2903/20 which competes in price with IBM's System 32, to the large 2950 which is performance-competitive with the IBM 370/158 though not yet the 3033.

The 2900s thus cover a broader range of prices and system sizes than any competing computer series except Burroughs' 900 Series, of which only the small and medium size models are found in Europe, and Honeywell's Series 90.

The 2900's common numbering system conceals a split between two totally different data structures and operating system families. At its lower end, the 2903, 2904, and the 2950 and 2980 systems running under DME perpetuate the old 1900 series 24-bit word

constraint on writing any larger programs. And to persuade 2904/1900 users to upgrade to the 2950 DME, its DME-3 operating system offers more powerful multi-programming facilities, including interactive MAC time sharing, than those previously available under Exec 2 or George 2.

By the time 2950 users come up against DME-3 and 24-bit word length limitations they are still far short of the 2M byte maximum main memory size of the 2950.

The 2950 thus covers a range of main memory sizes, prices and performance equal to those of two or three models on its competitors' product ranges (Table 1).

The systems with which it is competing include the IBM 370/125-2 and 370/138 and even

ICL has thus adopted a third solution to bridge the 24-bit word 2903/2904s and the older 1900s into the byte-oriented 2900 Native Mode series. This is the "swing" computer, able to run equally cost-effectively under either data structure and the operating system associated with it. That is the 2950, and that is what makes it so interesting.

In order to be effective as a means of defending an existing customer base, a "swing" computer must start at a price-performance level well below that at which the smaller of the two data structures and operating systems is outgrown, and be expandable to levels well beyond the transition point to the larger data structures and operating systems.

In that way, 24-bit word DME users will convert to VME/K or VME/B in preference to converting to an IBM, Honeywell or Univac system, because converting to VME/K or VME/B does not involve them in exchanging any of their hardware.

In order to implement that strategy, the ICL 2950 has been made more expandable and to cover a larger range of main memory and system sizes than any comparable system at present on the market.

It starts at 256K bytes, equivalent to 32K 24-bit words after taking the 128K byte DME overhead into account. Users of the 2904 would upgrade to the 2950 when they have outgrown the 68K word maximum memory size of their present system; 1902T users would switch when they have outgrown the 128K word maximum memory size.

Both levels are well short of the 2900 word size at which the 1902/2903/2904 24-bit word size begins to be felt as an absolute

length; memory-to-general purpose register CPU architecture; order code and operating systems. They also provide full object code compatibility with 1900 series systems running under Executive, George 1, George 2, and George 2-Plus and George 3 on the 2990 DME.

On the other hand, from the medium size 2850 and 2880 systems running under VME/K upwards, the 2900 series offers the same eight-bit byte, 32-bit word-oriented data structure that the System 4 offered in 1969, at the time of the ICL-English Electric merger. But whereas System 4 had a similar memory-to-general purpose architecture to the 1900 series, the medium-to-large 2900 machines are built according to a totally

different pushdown stack processing architecture, reminiscent of the old English Electric KDF series systems running under Executive, George 1, George 2, and George 2-Plus and George 3 on the 2990 DME.

Only Univac among ICL's major competitors offers comparable diversity of both data structures and operating systems in its current product range.

Start of the S Range

The most significant hardware architectural feature of the 2950 which distinguishes it from the rest of the range is the way it handles input/output and main store access.

Like the rest of the 2900 range (excluding the 2903/2904 series), the 2950 has an Order Code Processor devoted solely to program execution. The 2950, however, has a single Device Control Unit which controls all types of peripheral and communications equipment. On the rest of the 2900 models there are separate controllers for each type of equipment, such as a disc file controller and a communications link controller.

All store access requirements from the OCU and OCP on the 2950 are handled by a single Store Control Unit. On the other models, there is a Store Access Control unit

to satisfy main store access from the various peripheral controllers and a Store Multiple Access controller which interfaces between the main store units and the OCU and OCP.

Over the next few years, existing 2900 models, the 2970, 2978 and 2980 will be replaced by 8 versions, with the 2950 at the top of the range.

For the user, this new structural unit will mean more power for less money, precisely because it simplifies ICL's manufacturing process, giving it a profit margin.

Which was why OCU and OCP were so enthusiastic about the new S model.

Manufacturer	ICL	IBM	HONEYWELL	UNIVAC
Model	2950	370/125-2	370/138	64/50 64/60 66/05 90/30 90/60 1100/11
Operating environment	DME/3	VME/K	DOS/VS	DOS/V6 or OS/VS I
Word length (bits)	24	6	8	8
MAIN MEMORY				
Minimum capacity: - Words - Bytes	32K (128K*)	768K	68K	512K
Maximum capacity: - Words - Bytes	256K (1M*)	2M	812K	768K
Throughput (bytes/second)	10M	10M 20M(d)	4M	3M-14M
INPUT/OUTPUT				
Control by Max throughput (bytes/sec)	IOP	IOP	IOP	CPU
	2M-4M	2M-4M	68K	2.4M
AUXILIARY STORAGE				
Capacity (bytes) - per drive	60M, 60M 100M or 200M	60M, 30M 100M or 200M	36M, 70M 100M	85M, 70M 100M, 200M, 280M or 317.5M
- max online	2,400M	2,400M	1,120M	5,000M
OPERATING SYSTEM	Real	Virtual	Virtual	Real (Virtual in prep)
Multi-programming, maximum number of jobs including time-sharing	64	64	6	4

Table 1. Comparing the specifications of the ICL 2950 and its competitors. Notes: *Effective memory; 128K to 256K bytes have to be added to this for the DME overhead. (d) Dual-processor systems only.

COMPUTER EDUCATION

Improving public awareness of computer use

By Roy Atherton



Roy Atherton

IN the years from about 1968 to 1970 some major events in computer education have occurred. The first GCE A-level syllabus in computer science was taught; the Hoskyns organisation produced what was later to become the ICL Computer Education In Schools scheme; the working party on Computer Education in Scotland produced its interim report recommending the establishment of four computer education centres; Hatfield Polytechnic planned and installed its DECsystem-10, of which one third was allocated for school and college use; Basic was invented and crossed the Atlantic Ocean. There were other developments born of tremendous individual enthusiasm and effort in various countries.

Anyone familiar with the organisation and management of British schools would not expect much change to follow these early enterprises and the table shows it was not until the mid-seventies that significant changes in the curriculum had occurred (Table 1).

This is a comparatively rapid infiltration of the school timetable; for better or worse "modern" mathematics took from 50 to 100 years from being invented to getting into the school curriculum. Many other worthy subjects such as cybernetics or psychology still haven't made it.

It is arguable that the efforts of many enthusiastic pioneers - probably the 3,000 or so subscribers to "computer education" - have been rather more productive than one could reasonably expect.

While this modest progress is taking place in schools, universities and polytechnics are responding in their different ways to the challenge of computers. One may argue about the content and effectiveness of their courses, but the courses do exist. So does about £10 million worth of computing equipment which is included and replaced at the rate of something like £15 million a year. And £2 million have just been spent on computer assisted learning projects. In the further education sector progress has been made with courses for operators, programmers, analysts and an impressive range of national certificate and similar courses.

The only sector of further or higher education where progress has been minimal is the teacher training sector. The effect is that the output of teachers has been cut by about two thirds thereby substantially reducing the potential rate of curriculum reform by new teachers. In-service training has, in theory, had a great boost but, so far, shortage of funds for replacing released teachers in the colleges devoted to in-service work was one twentieth and is to be two thirds by 1980, but it is two thirds of a very much smaller total resource.

All this data is intended to show that, despite the promising events of the late sixties, it is not really surprising that people - even young people - still have depressingly strange ideas about computers. However, things are beginning to happen in the schools at last, and the advent of the reliable mark sense card system and cheap microcomputing power should provide further stimuli.

The simple growth of computer studies as a school subject is no guarantee that the teaching is good, but at least pupils who have completed a CSE or GCE syllabus have experienced computing, and they know that it is essentially the study of information systems rather than a curious offshoot of mathematics.

amazing ability to survive in ice and snow; Indians for their ability as hunters and warriors, and so on. But Britons, it seems, are not admired for their ability to survive well in our technological environment. "Survive well" means understanding your house, its systems and its contents, including the contents of its garage, to enable you to do simple repairs and improvements, and to know enough to avoid being gyped by an "expert" when a job is too big for you.

A good survivor should also be able to contribute sensibly to decisions in his place of work. It may be difficult to see how non-specialists can contribute to decisions about specialised technology, but they do. As an example one may quote the resident sculptor in a college of education who was a member of the finance committee. Another member had presented a case for buying a dual-drive floppy disc system for the college computer. The sum involved was a modest £2,600 but the sculptor could not come to terms with it and ended his verbal attack with a slightly hysterical and quite inaccurate comment: "There'll be nothing left for anyone else."

A cowboy or Indian or Eskimo was probably taught by his parents and their friends but a British child is taught in a British primary school where there is a negligible amount of advance teaching, and in a British secondary school where the dominant traditions are still those of the men of letters rather

than the men of science. Thus the influence of the media, as far as the image of computers is concerned, can also be traced back partly to the influences of the educational system. The conclusion is neither revolutionary nor even surprising.

To improve public awareness of computing we need education at school level. But to get this we need to overcome the widespread ignorance of computing.

Roy Atherton, a senior lecturer in computing at Bulmershe College of Higher Education, Reading, discusses this vicious circle and looks optimistically to the future of computer education.

The problem is not confined to computing, but in this field it is particularly acute because the growth of computer usage has been very fast and its nature makes the acquisition of general understanding difficult for most people. Lal Makkar, during a research fellowship at the University of Surrey, coined the phrase "computer awareness," and proposed short courses with tape and slide sequences which would appeal to any age group from 10 upwards. The courses have not yet achieved widespread popularity.

Equally the slow growth of computer assisted learning in schools has disappointed many people. Part of the trouble is that the ignorance and prejudice which are the targets for attack are at the same time the barriers which do not let the battle commence.

If we wish to improve public awareness about computers and thereby, one hopes, improve attitudes and decision making, it is arguable that we should aim at encouraging the growth of examination or other courses in schools. Others would argue for encouraging computer assisted learning in various subjects at all levels of education, but two points are worth making.

First, good computer assisted learning usually requires collaboration between a computer man and a subject specialist, such as a geographer, as well as rather better computing facilities than many schools can get at this time. It is, therefore, a slightly more difficult goal than the encouragement of computer studies itself.

Secondly, when some sort of computing environment has been established, computer assisted learning becomes much easier to develop as a secondary effect. If it is accepted that the target should be to encourage the growth of computer studies in schools, then how can this be done best?

Schools themselves control the curriculum and while the Department of Education and Science and the local authorities can exert pressures there are inhibiting factors. Unlike the Scottish Education Department, the Department of Education and Science does not have a policy, as such, for computer education in schools. However, students of the educational

scene of recent years may have discerned some trends. Only one actual computer man has been appointed to the part of the national Inspectorate responsible for schools. Other inspectors have taken an interest but the view that while computer education is a good

thing we must be careful not to drain away the already scarce mathematics specialists has been expressed.

The argument does not bear too close an examination but it is used and one would expect it from well intentioned inspectors who have been lifelong specialists in mathematics and

are only part time members of the computing fraternity.

The Department of Education and Science is currently reorganising itself and we must wait to see what emerges. Local education authorities also need persuading of the merits of computer education but they are probably getting more enlightened as they learn more about it in response to pressure from teachers and parents.

If the growth of computer education is to continue then the schools need to feel that they can get the resources they need: staff, computing facilities, teaching materials and the right kind of relationships in the area.

Most schools developing computer studies find a need for substantial batch processing facilities complemented by extensive use of an online terminal or a small in-house system. Only a small proportion of schools which do computing have anything approaching this

dual requirement.

It is to be hoped that computer education centres or advisory units can continue to increase in number though, one hopes, not in size. Small centres with low overheads and an educational environment are needed. They should provide a low cost but educationally sound service which includes teaching resources, and contributions to in-service and pre-service training as well as computing facilities.

In particular, they should positively encourage good standards and good approaches to computing such as Makkar's computer awareness materials, or concepts of structure in programming. Part of esteem for computer education in the school curriculum is not far away, but it should be earned by greater efforts in in-service training and better standards. The growth will probably take care of itself.

Computer Training: Why 'Old School' loyalties could be costly

The old school of thought maintains that basic systems training should be confined to basics. It holds, for example, that in-depth indoctrination in communications systems and sizing techniques should be made available only to 'experienced' systems designers. A reasonable point of view - if the computer industry wasn't evolving so fast. In fact, progress has been so swift that yesterday's advanced techniques are rapidly becoming today's accepted norms.

This is why ICL's new Basic Systems Training syllabus has a far less elementary look. As you can see: Data Processing Concepts (DPC) - 1 week. Systems Analysis and Logical Design (SALD) - 2 weeks. 1900 Systems Design and Implementation (SDI-N) - 2 weeks. VME/B Systems Design and

Implementation (BSDI) - 2 weeks.

With this new school of training thinking comes a more far-sighted attitude to qualifications. Our experience suggests that NCC certificate is now a minimum standard to be achieved by attendance at these new courses, although the Certificate can still be taken on completion of training.

Finally, our courses shouldn't be seen in isolation. Subsequent training programmes have been brought into line with our concept of progressive training (the course interfaces are shown in our brochure).

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The vital element in today's schooling

THE Inner London Education Authority is unique among UK local authorities in having the sole function of providing an educational service for the teeming millions of the metropolis. Its officers do not have to concern themselves with the conflicting claims for building sewers and beautifying parks, for lighting streets and disposing of the dead; they can concentrate on the problems of educating seven million people.

Not only does ILEA provide infant and primary schools (about 900 of them), secondary schools (some 200), further education colleges (over 30) and five polytechnics, but there is also a network of adult education institutes, youth centres, sports centres, theatres and even prison education units. Big is not necessarily beautiful and the problems of inner London are, to say the least, daunting. Nevertheless, the size and scope of the authority enables it to provide services which smaller bodies cannot aspire to. This is particularly true with regard to the computer education facilities which have been built up.

To its credit, the members of ILEA have accepted that computer education should be a vital element of every child's schooling. If the population at large is to be enabled to come to terms with a world which will be increasingly dominated by the use of computers. In a period of severe financial constraint it is not possible to implement this policy in its entirety, but considerable progress has been made. Although it is hoped that ultimately we will achieve a high degree of integration in the provision of computing facilities right across the educational spectrum, each sector has different needs. So far, only the

ubiquitous pocket calculator has penetrated the primary schools and the major developments have taken place in secondary schools, the colleges and the polytechnics.

There are three aspects to computing in schools; we are persuaded that it is a good thing to teach children about the computers; we believe that computers can help teachers enrich curricula; and we would like to use computers to help run our schools.

In rather more than 100 Inner London comprehensive schools, children may opt to take a CSE in computer studies; in a few of these, O and A levels are also available. These courses consist of a section on the history of information processing, usually from the abacus to Herman Hollerith, taking in Babbage and the slide rule on the way, then on to fourth generation computers.

There is a thorough section on the computer and its peripherals and the children learn about the organisation of computer departments. They also learn a little programming, usually in Basic, and are taught in general terms about operating systems and applications programs. The use and impact of computers on society are also dealt with.

However, a high proportion, between 20% and 50%, of the marks for the subject are gained for practical course work which may be studies in depth of some aspects of these syllabuses or may be programming projects.

However, possibly of more significance in the long run to the quality of the education we provide, is the fact that we are beginning to use the enormous potential of the computer as a simulator to support teaching in a number of subjects, notably in mathematics, physics, chemistry, biology, geography

and economics. One barrier that has to be overcome is the widespread impression that computers can only be of help in mathematics. It is often easier to produce relevant software in mathematics, but once the effort has been made to write the necessary programs and backing up material the motivating effect on children justifies the effort required.

Much remains to be done in this area. Few teachers have experience of computing before starting to teach, and in this computing is unlike other subjects. For this reason our

DEREK ESTERSON, the Inner London Education Authority's Inspector for computer education, describes how his authority is striving to ensure that computer education is a vital element of every child's schooling.

Any opinions expressed in this article are Esterson's alone and should not be taken to represent those of the ILEA.



in-service training programme is particularly important, and teachers are encouraged to attend both residential and non-residential courses. A vital element in these courses is the study of real applications under the guidance of experts from the data processing world.

In school administration there are a number of schemes at various stages of development for pupil record keeping, curriculum analysis, computer managed learning, automatic production of statistical information and reports, and of course, school time tabling. This last has consumed considerable resources over the past 15 years and none of the three

approach contains a large element of interactive access, particularly during editing the phases of the construction of a school timetable. However, we lack the resources for satisfactory implementation of any of these schemes for all our schools.

Computing in Inner London colleges of further education is not yet highly developed. A few colleges have received obsolete cast-off machinery and the City and Guilds O and A-level courses are available at some colleges as well as National Diplomas and Certificates. We have a number of so called link courses in which colleges co-operate with nearby schools in the running of courses. The application of computers in the various technologies in commerce and industry is so far largely neglected.

This brings us to the computing facilities we have succeeded in providing for the colleges. In mid-October, 1977, a 48-port Digital Equipment PDP-11 was installed at City of London Polytechnic for the use of Inner London schools. By the end of the current financial year about 140 secondary schools will have been equipped with printing terminals. The majority of these are teletypes, but there will be about 25 300-beud keyboard printers.

The network has in the past been based on the use of dial-up telephone lines but we are beginning to change over to dedicated lines in order to contain communication costs. A 32-port Hewlett-Packard 2000F, previously used by the schools, is being upgraded to a 2000 Access configuration, and online computing laboratories are being set up in the colleges. The number of terminals at these laboratories will be eight, four, or one according to individual needs, and will include keyboard terminals, VDUs, card readers and graph plotters. Connection to the

central computers facility will be by a mixture of dial-up and dedicated lines, and there is to be a back-up courier service by van for batch work.

From a technical point of view an interesting feature of the central system will be the way in which users gain access. Two 32-line Datal "bureaux" and all the dedicated lines will be connected to a processor which will route users to either the DEC or the HP machine. Full contention and a range of line speeds will be provided and other computers can easily be added to the network.

Nor has the microprocessor revolution left us untouched. This year six or seven schools are likely to have micros. A few intrepid pioneers have purchased kits, but in general we insist that schools should have professionally constructed machines because, apart from considerations of safety, we must attain a high degree of standardisation in order to ensure satisfactory maintenance and a flexible system of software exchange.

It seems highly probable that by the early 1980s the hardware and software development of microcomputers will have progressed sufficiently for us to base our school and college systems on them while maintaining an appropriate central service for those tasks beyond the scope of the local machines. This will enable us to escape most of the consequences of ever increasing costs of communication over telephone lines.

In a small number of schools and colleges outside our own authority which have already installed microprocessor systems, we observe profound

differences in the motivation both pupils and teachers. Remedial English to music, mathematics to geography; teachers are discovering that in-house microcomputer resources enable them to get to pupils in a way which is always possible using or techniques.

However, the systems are yet very robust and despite the availability of a computerised colleague who, at a drop of a byte, will whip soldering iron or instantly of a previously undiscovered. So, for the present, we are obliged to maintain a centralised network of carrying out experiments improve the reliability of use of the new systems.

Naturally the complex needs of polytechnics; problems of a different magnitude. In Inner London there are five polytechnics until recently computing developed in a piecemeal fashion. The unsatisfactory state of communication equipment and of network software, allied to financial constraint, led to a polytechnic developing to extent in isolation. The systems based on two 1902As and a 1905E installed and remote job stations to the 1905E, backed by a von courier service, rather primitive facilities.

The provision two years of two DECsystem-11s is used to make available facilities to all five polytechnics and pointed the way to an integrated system in which, for the first time, our students

had obliged us to underpower them. At the end of 1978 the 1905E will be withdrawn from service, and we are currently engaged in deciding on a replacement. This is an opportunity to further



responsibilities between the head and the student and it is convenient to label these as the principal, the department head, the instructor and the student. There is a need for close personal interchange between the various levels, for example, the student must interact with his department head.

When one considers the materials used in the teaching process, these are often found to be presented to the institution by an education authority. They are distilled from the immense variety to a sub-set from which the institution may choose.

The variety of materials, be they books, films, computer assisted instruction or other aids will have been produced by individual authors and may have been subject to some ordering process by a curriculum designer, who endeavours to produce a scheme of inter-locked materials that may interest the education authority. Around all this activity are the examining bodies which assess the products of the educational process — be they for jobs, university entrance or the acquisition of degrees.

It is quite apparent in the present world that there is little inter-relationship between, say, the instructor and the material authors or the curriculum designers. The timescales of the present system are too long to allow such an inter-relationship to be fruitful. Text book production today often takes several years while the scripts pass through a major assimilation process in the corridors of power of the education world.

Plato has established a means of communication that inter-relates all these various bodies. It has been created in such a way that the inter-relationships are a

Plato's role in a responsible society

natural outcome of the communication principles adopted by the Plato designers. In essence, it has taken the principle that information presented to anyone connected to the system is best considered as a lesson.

Thus, if a student leaves information for an instructor this is considered as part of a lesson. If a body of students criticises a particular lesson and presents its notes collectively, what is then created is inevitably a lesson for the instructor. He will acquire knowledge as a consequence of these notes which will enhance his abilities as an instructor.

The same concept is preserved throughout the Plato system and there is easy inter-relationship between the bodies mentioned above. We now find that authors of lessons can rapidly obtain experience of new techniques that they may have introduced. They have direct access to a pool of students; they can get instant feedback; curriculum designers can discuss changes with authors; department heads and educational authorities can work hand-in-glove with the material creators.

This so far has been the basis of the Plato development and it is, perhaps, now being seen that the creation of this tool in an educational environment has been so complex that it encompasses, as a sub-set, the inter-relationships that exist in many

other activities. There is no difficulty now in conceiving a similar set of relationships that would exist for, say, a manufacturer of home appliances.

The authors are now a combination from research and development and manufacturing; the curriculum designers from product planning; the educational authority becomes senior management and the executive line becomes the line from the sales director to the junior salesman. The examining body could be replaced by the finance director. The inter-relationships between these bodies are, in essence, very similar to those in an education environment.

If anything, they are more rigid, simpler to emulate and more able to use a computerised relationship approach. The experience of Plato is already

has covered the whole development of Plato and has forced a major integration between the hardware and software interface with the user. It has been well known that graphical and pictorial presentations are highly stimulating to students and from the outset the Plato terminal has been heavily graphically oriented.

The terminal is designed for easy use, being a traditional typewriter keyboard with a number of additional keys and a non-flicker touch-sensitive screen. Lessons are written in a language specially created for Plato which ensures that those with ideas can create their lessons with minimum recourse to other specialist help.

The system is further enhanced by facilities for including online consultants who can advise authors on the preparation of their lessons and this facility is extended so that an author can instantly communicate with another author on the system or leave messages for one who has a registered address or sign-on.

An author can start small and explore the lessons that reside in the system which explain the various capabilities, gradually extending his own abilities and learning how to create better lessons. Many lessons, which already reside, can equally be explored for ideas and concepts. The terminals are connected to a centralised Control Data Cyber computer equipped with large memory and lacking store. The response time is kept to well below one second and every advantage is taken of a deep understanding of the nature of an inter-personal communications load rather than the traditional comput-

ter load. Although, the system is optimised around its use as a tool for education, there are many facilities which can be used in a traditional sense such as calculations, data storage, data manipulation and many others.

For many who are used to the rigid conventions of any interactive computer system, the use of Plato can seem like a liberation. For those who are burdened with large scale scientific computation, Plato cannot offer a comparable service except that in many instances the data manipulation that often circulates within such development could benefit from the human interface built into Plato.

An international network of terminals connected via satellite from Europe to the US is being established. This will be followed by the installation of Plato systems in many countries. The UK is now connected with a terminal in one of Control Data's London offices.

Plato is the state of the art in bringing computing to the natural habits of society. It offers a convenient, additive and entertaining way of conducting relationships that without Plato seem clumsy, slow and prone to faults. All forms or organisations will see in Plato a resolution for many of their internal training and communication problems, and to many of their relationship difficulties with the outside world as the information stored within Plato increases through use.

Plato is the beginning of a new approach to introducing computers into society where the accent is on the responsibilities inherent in that society and not on the limitations of the computer.

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Vital element in schools

From page 16

would be able to get quick access to modern facilities. Almost from the start, the new machines were heavily overloaded; financial restrictions

had obliged us to underpower them. At the end of 1978 the 1905E will be withdrawn from service, and we are currently engaged in deciding on a replacement. This is an opportunity to further

develop interactive facilities and to move towards an inter-polytechnic network.

Ideally we would like to make each node of the network a centre for some aspect of the work, be it specialised packages, graphics or, say, production control techniques, so that facilities don't have to be duplicated (not to say provided in quintuplicate). We have a number of problems to solve, not least of which in the current climate is finding the necessary cash. The management of an integrated system by teams of people understandably jealous of their independence within each polytechnic will require tact and compromise.

The method chosen to implement the school and college systems make it easy to add them to the network but there are bound to be conflicts of interest in the competition for prime time. Already some schools' projects, such as a computer managed mathematics scheme, which is too big for the school's computer, are difficult to accommodate without prejudicing the service to the polytechnics.

The logistics of arranging to use our computers for time-tabled 200 schools are daunting. Nevertheless we have the prospect of using computers within the education system to improve the quality of education in a wide range of subjects (and who can deny the need for this), while providing tuition which is relevant to the modern world, and may enable us to produce people with the right background and training to make the most efficient use of modern equipment.

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DONALD ALCOCK

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Picture by Mark Gerson.
The quality of end user education can make or break a new computer system. NIGEL LAURIE, director of the consultancy Communication Audit, offers some practical advice which can make success more likely than failure.

System success via end user training

EXPANSION is widely welcomed in computing as in much else. But growth brings problems. A new application means new end users. And new end users mean fresh demands for user education.

The need to educate these users has been admitted for some years. Remedial education in computing concepts is now plentiful and often good. But training in system use is harder to do well and the task often falls to DP staff.

At least three factors hinder the success of end user education today.

At the outset, many users do not want training at all, but only its results. They demand know-how but not the work of learning.

Hard-pressed managers often lack time to learn all they might; and sometimes acquire less knowledge than they need.

Indeed, in user education at senior levels, providing no less than users need and no more than they want is perhaps the hardest task of all.

A second hindrance to user training is the impact of computing itself. New systems can threaten users. They can erode status, make work dull or make it complex. They may displace a worker's hard won skills.

Finally, the growing range of user needs poses new problems. The more systems embed themselves in work, the more varied users will be.

The problems, however, can be tackled. Here are 10 practical guidelines which should be considered before investing in user education:

1. Users are individuals. Users are like any mass audience — a crowd of individuals. They can be grouped in many ways; by

age or rank, job or education.

The key to success in user education is to group users by their training needs. Other factors matter, of course, but training needs matter most of all.

2. People learn what they need — not what they are taught. It is easy for any trainer to feel he knows best. He knows the techniques and knows he can stage an effective "learning experience". But training cannot succeed through technique and skill alone. A simple flaw prevents much training achieving the success it might, and that flaw is that the right techniques are used in pursuit of the wrong objectives because trainee-needs have been poorly understood.

It pays always to go and ask trainees precisely what they feel they need to know about a new system. Doing so keeps training

practical. And it can uncover attitudes which block learning.

User needs vary. But there are three areas which workers confronting new systems tend to worry about:

a) How will this system affect my job? Will it help me work better and make my work more rewarding? How can I make it do so?

b) How does my job with this system make sense? How does it fit in and contribute to the organisation?

c) Can I trust this system? Different users will pose these questions in different ways. User education should aim to answer them all.

3. Define objectives. Objectives keep training down to earth. They keep it in sight of success by preventing it trying to achieve too much. They focus on what people do, on behaviour and not states of mind.

When you state the objective of training or education you answer the question "What should people be able and willing to do differently as a result?"

Much money is spent when this question cannot be answered or on events for which no realistic answer can be given. Yet objectives are as vital for "appreciation" sessions as for programming workshops.

4. Make techniques serve your objectives. Many training techniques are in use and costs can vary dramatically. It is easy to be seduced by new "hardware" and "software" (jargon for "projectors" and "aides") but the experience can turn out to be costly even if pleasant.

Lectures, in contrast, may be mediaeval but they have their uses and sound and vision usually keep in step. The discovery approach to learning has great strengths, but sometimes rote learning works better. Business games are fun but some research insists long term results remain to be seen.

In this minefield the answer is to think through with care how the techniques will serve the objectives. Consider what you in the past and ask current users if there is any doubt.

5. The biggest problems occur outside the training room. It is easy to hope that once objectives, contents and techniques are settled, training will have a clean run. This mistake explains fiascos in many fields.

For what happens outside the training session matters no less than what happens within it. And by their nature, the challenges outside are the toughest to handle.

In DP, problems for training can be created when the system is designed. They can be multiplied by failures in user aids and support.

If the system is not built to be usable and if support material is written late and in haste, then user education will have an uphill task. It will have to carry a corrective burden it cannot hope to bear.

To help prevent such problems the user manuals should be written first. Then the system can be built to meet user needs in a usable way. And user education can be planned at an early stage.

It also offers a chance for users start-up training at the same time. It could be more often than it is.

7. User education is a development. Training needs today's tasks is not enough. For systems, as know, change and expand. User needs and ambidexterity grow. Sometimes even additional sets in.

Since change is frequent, education cannot be complete in a day. A sound approach limits the objectives of training; it sets out to get user started and equipped; learn more for himself.

8. Exploit the graphics. Every manager knows the organisation charts are one thing and the way communication flows is another. But this fact is often regretted when it ought to be exploited, for the best teaching is often given through informal channels.

In user departments, enthusiasts spring up. They become the most effective trainers one could hope for. As users they know user-needs. As enthusiasts they know the value of computing and the commitment shows.

They are natural links between user functions and the — perhaps the middlemen — tomorrow. And they can persuade ambassadors for it among new users.

They are a resource all too often ignored.

9. Look out for the incompetency trap. Like a tragic poverty trap, this vicious circle. The less a user has learnt, the less he will gain from the system — and the less he will come to value it. The less he values it, the less time he will want to spend learning. And so he never reaches the threshold where effort he makes pays off in benefits which encourage him further.

10. Build an employee education strategy. With user computing growing fast, employee education strategy makes good sense. It should be a three-year rolling plan to make the organisation safe for computing.

Work should start with a review of current system plus (including office systems) and employee understanding of DP. Then a map of skill and knowledge needs among staff for the next three years can be drawn.

Some will need simply an overview and the chance to see VDU — to overcome sheer ignorance. Others will need training to operate new systems. Whatever the needs, a training plan will help to ensure they are tackled in good time and at the lowest total cost. Without a strategy, education tends to be ad hoc, solving today's problems — but ignoring tomorrow's surprises.

One surprise may be how much employees know about computing and its impact. Most DP managers will have a good feel for this but when asked about employee attitudes, data should be gathered.

A systematic survey of a small sample is the most practical and reliable start. Then a strategy which will give results in the years ahead can be built.

And a strategy is a prime task for DP education — it is the task for tomorrow's systems.

The untapped enthusiasm

GROWING enthusiasm among school children for computing is being wasted because of the shortage of people who can teach the subject to an advanced level, and a lack of awareness of computing in schools.

This is the view of Andrew Parfitt, who has switched from being a mathematics teacher to doing a little computing at Hackney College of Further Education to a full-time lecturer in computing at the college. The shift of emphasis was due to demand from students for more effective instruction in computing subjects.

"Schools can offer CSE

courses," he says. "A few offer O-levels and fewer still A-levels. The main problem is staffing. The maths teachers with a little computing knowledge are told that they are now the computing teachers."

"The enthusiasm is there among the pupils but it can't be tapped. Computing is coming in by the back door and has not established itself yet. If it had not been for the enthusiasm of my students I would have given up long ago."

Parfitt's points are endorsed by the fact that whereas nearly 100 schools controlled by the Inner London Education

Cure for shortage of teachers

A BIRMINGHAM COLLEGE has introduced two courses for teachers which should go a long way to curing the shortage of computing teachers and schools' ignorance of the subject, two problems highlighted by Andrew Parfitt of Hackney College of Further Education (see above).

Westhill College has just started a BEd degree course on mathematics and computing for teachers who want to add to their qualifications.

The three-year, part-time course is aimed at producing people who can teach computer studies with authority to A-level standard.

Another new course offered by Westhill is for teachers with

at least five years' experience who aim to become advisers on computer education for their local authority. The diploma course in computer education, believed to be the only one of its kind in the UK, covers the computer in society, computer assisted learning, packages for schools, and the role of computing in the curriculum, as well as practical programming and systems analysis.

This course runs for one year on a full-time basis or two years as a part-time course. It is recognised by the Department of Education and Science.

Further details can be obtained from The Principal, Westhill College, Weoley Park Road, Selly Oak, Birmingham B29 6LL.

First export orders

FIRST export orders for ICL's 2903 Education System are among a batch of seven orders taken in the last four months.

The overseas orders are from Darwin College in northern Australia, and Limerick Institute of Higher Education in the Republic of Ireland. Both will use the system for teaching and for administrative jobs.

UK orders have come from Dorset Institute of Higher Education, which is to provide online computing for Dorset schools; North Gloucestershire College of Technology; Highbury College in Hampshire, which will also serve schools

and aims to link systems with the 2960 at Portsmouth Polytechnic; Preston Polytechnic and Liverpool University.

At Liverpool the 2903 will replace card punches and be used both for data entry by students to a 1906S and as a stand alone system.

ICL says the fact that these orders have been placed in very hard financial times is an indication of the company's continuing strength in the education market. Since the education system was launched last year (CW, May 6, 1976) 20 have been sold, and another 20 orders are expected.

Compower expands

PENETRATION of the Middle East market and the introduction of a 20-week course which combines classroom teaching with on-the-job coaching mark a substantial expansion by the training division of the National Civil Board's bureau subsidiary, Compower.

Compower has been taking foreign students for four years in a small way, but now expects to take up to 50 a year. Saudi Arabia and Libya are its biggest markets, although it has dealt with Kuwait and is considering Nigeria.

"The UK is very well regarded

in the education field," said Edgar Wille, head of recruitment and training at Compower.

The new course for UK staff, launched this week, starts from scratch with two weeks of computer appreciation and three weeks of basic Cobol. Students next spend 10 or 12 weeks writing programs for their company, with tutorials at least once a week. They then return to Compower for an advanced Cobol course.

The course costs about £130 a week for the full-time classroom sessions, excluding accommodation.

Midlands competition

SCHOOLS in the West Midlands are being asked to find a useful and original application for computing in a school, the community or local industry in a competition organised by the Computer Education Group. The group's aim is to encourage the use and development of computer education in schools. Local firms are being asked to

contribute to a prize fund so that the winning school can provide or improve its computing facilities.

The competition closes next May. Companies wishing to contribute to the prize fund should contact Diana Burkhardt, Computer Centre, Birmingham University, PO Box 363, Birmingham B15 2TT.

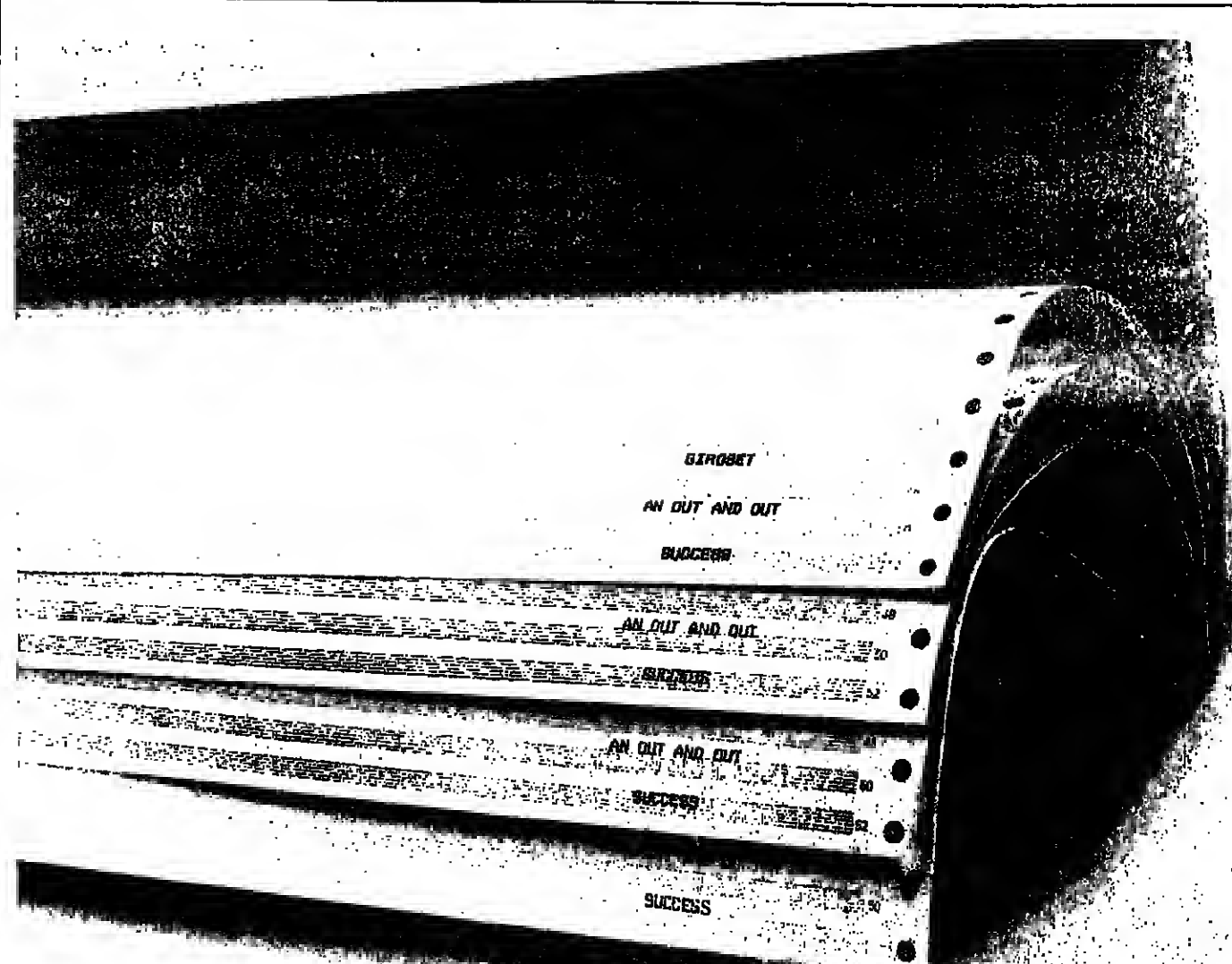
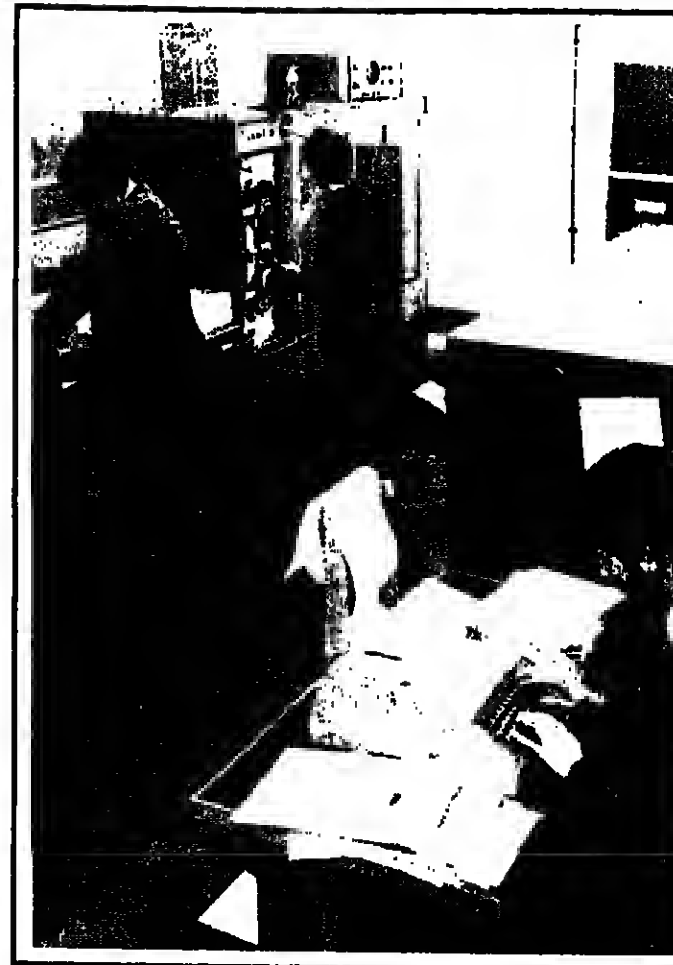
Power to the school room

A BUSY computer room, with operators loading tapes and discs and driving the moshing through the console... but this computer room is a bit different, for it is run by pupils at Shrewsbury School, an independent school of about 660 boys. This computer is an ICL 1902, donated by a Sheffield firm and brought into service and maintained by the school.

The system has been running for over a year, with only occasional help from ICL. It has 32K of memory, two EDS 6 disc drives, giving 18 Megabytes of storage, four tape drives and a 600 lines per minute printer.

The staff of power means that boys get a turn round of a few seconds, submitting their jobs on paper tape and collecting the output straight from the printer. More ambitious boys use disc based compilers.

The effect of having a computer at school is shown by the fact that one pupil, Mark King (seated at the Teletype console), was taken on by ICL for a couple of months between leaving school and going to Cambridge University. Within a month he was an operations manager and he set up a 2903 installation from scratch.



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To provide DP Managers and Personnel Officers of firms using computers with an overview of current practice in the recruitment of computer staff.

Shortage of computer staff is a problem which faces all computer users. A lack of qualified personnel is exacerbated by the mobility of computer people and their apparent loyalty to the job rather than the organisation.

In these circumstances recruiting suitable staff poses particular problems: How does the user set out to attract staff? How does he advertise effectively? How does he manage the selection process? Should he use a recruitment agency? Is the use of contract staff a viable solution?

The seminar will seek to answer these questions and to indicate what the computer user should do in order to formulate a successful recruitment policy.

Session 1:
Introduction. The computer scene and computer people: Who are they? What are their characteristics? How are they motivated? Can supply ever catch up with demand?

Session 2:
The user's viewpoint. Finding a way through the recruitment jungle. How can the computer user act effectively to obtain the staff he needs? How should he go about recruiting staff? What are the pitfalls? Planning staff recruitment and development rather than reacting to crisis situations.

Session 3:
The role of the recruitment agency. Identifying user's staff requirements. Specifying the post. Giving the user the benefit of specialist knowledge of the job market.

Session 4:
The NCC Job Selection Service. Systematic tests to assess applicants' qualities can provide a standardised basis for selection when compared with national norms — thus providing a useful aid in the selection process.

Session 5:
How to advertise for computer staff. Specifying the job and the working environment. Writing the advertisement. Adopting a creative approach to job advertising. Media selection. Maximising response.

Session 6:
The DP Manager. Picking the right man for the most responsible job in the computer dept. Fewer in number than other categories of computer staff, the post demands a more generalist, face specialist approach than programming and system analysis and a wide ranging knowledge of the business. Filling this key post is a test for a reputable recruitment bureau.

Session 7:
Contract Staff. Increasingly contract staff are being used to overcome work bottlenecks, help in conversion programmes, etc. as well as to holidays and sickness. Now the use of contract staff is such a well-established feature of the computer scene that it merits inclusion in an overall appraisal of the recruitment problem.

Session 8:
Maintaining standards in the recruitment division. What are its aims and objectives? A consideration of the code of conduct.

The speakers will include Tony Miller of Furness Witby, David Payne of Tascos, John Wood of EMS, Humphries of Knight Computer Services and Neville John of OCC, chairman of the CSA Recruitment Division.

Please return coupon to:
Conference Administrator
IPC Business & Industrial Training Ltd
Survey House
Throby Way
Sutton
Surrey, SM1 4QQ
Telephone 01-843 8040

Please reserve a place at the "Solving the computer staff problem" conference to be held at the Cafe Royal, London W1, on Thursday, January 19th, 1978. The fee is £55.00 plus 8% VAT (£4.40). Invoice will be sent.

Please send confirmation of booking to (CAPITALS please):

Mr/Mrs/Miss

Company

Address

Telephone

CW/DPMA workshop

Dole December 1
Venue: Holiday Inn, George Street,
London W.1
Price: £15 plus VAT (£10 plus VAT
for DPMA members) including
lunch and refreshments.

COMPUTER WEEKLY in conjunction with the Data Processing Management Association is organising a workshop on December 1 aimed at improving the skills of DP management in communicating with end users. The workshop will be given by Nigel Laurie, who has more than 10 years' experience in the communications and computer fields. The last in his current articles for Computer Weekly on DP/user communications, which will form the basis of the

If you would like to attend the workshop, please complete the form below.

I wish to order ticket(s) at £45 plus VAT (at 8%) for the CW/DPMA workshop to be held at the Holiday Inn on December 1.

DPMA members can apply for reduced rate tickets via the form that is being sent to all DPMA members. Cheques should be made payable to IPC Business and Industrial Training Ltd.

Name
Job function
Address
Telephone number

If you are interested in attending any future workshop because the December 1 meeting is full or is inconvenient, tick here ☐

Return this coupon to Computer Weekly/DPMA Workshop, IPC Business and Industrial Training, Throwley Way, Sutton, Surrey SM1 4QQ.

workshop, is on this page.

Numbers are limited to ensure that all delegates are able to participate fully in the day's work, but if there is sufficient demand, further workshops will be held.

In order to ensure that the workshop is tailored to DP Management's real needs, the DPMA is currently conducting a survey of its members on DP/user communications. Survey forms can be obtained from the DPMA, 27 York Road, Maidenhead, Berkshire SL6 1SQ. Tel. 0628 29979.

If you would like to attend the workshop, please complete the form below.

DP/user communication Part 5

by Nigel Laurie

What Bangladesh has taught us

EVERY DP manager these days is what jargonisers would call "an agent of change." He needs to get new business systems accepted — and working. He needs not just user understanding but user consent — and then user satisfaction.

The problem is hardly news and certainly not unique. It's a subset of the worldwide problem of getting innovations accepted. The challenge the DP manager faces is not so different for instance from that of promoting rural development in the underdeveloped world — say in Bangladesh of the 1960s, a country ravaged by disasters, laid waste by civil war and hit by political turmoil (the subject of a recent and significant report).

The Comilla Rural Development project in Bangladesh was a vital exercise with an aim familiar to every manager: to mobilise people to use their resources better. How the project staff tackled it and what they learnt can tell us much about making change happen.

1. They exploited accepted communication systems. To start with, the project leaders did not use mass media from "outside" to win over and instruct the villagers. They used communications systems and resources which were already proven. They found opinion leaders — accepted, trusted and

good communicators — and used them as go-betweens, explaining the project to the people. They used the traditional village meetings — in the traditional places — instead of new occasions.

2. They talked to the grass roots. The development experts made face to face contact with the villagers — on whose cooperation the project depended. As work progressed they found that direct feedback was vital from the villagers themselves. They had to bypass the bureaucracy to get an authentic feel for the problems facing those working most closely with the new methods.

3. They made communication practical. The developers did not promise the earth. Since the communication was personal, it could be precisely tailored. It focused on the needs and knowledge of the villagers. It related all messages to activities the villagers could perform.

4. They kept expectations low. If a new development had not been proved locally and if supplies and services were not yet available, it was not mentioned. Promise did not exceed performance. Frustration and disappointment were avoided.

5. They found communication needs changed. As the project got under way people's information needs grew. The first problem had been to get through to the rural people and win them over. Now the problem was one of meeting their growing need for information. Face to face communications broke down from overload. It couldn't be used to carry all the details in complete and accurate form. More formal channels were needed. A strengthened communication system was required.

The comparison shouldn't be driven too far of course. But the lessons from Bangladesh suggest that the daunting problems

of making new systems work smoothly can be overcome with skill. The success in Bangladesh suggests the following:

- If you want to sell something new — communicate through channels people know and trust.
- If you want to keep people with users — relate all information to their practical exact needs.
- If you want to control expectations — use personal communication systems.
- If you want useful feedback — get it direct from the end user.
- If you want satisfied users — keep a check on their changing communications needs and a personal and formal channel.

The personal links can take information, the formal channel can supply vital detail. "Communication and Rural Development in Bangladesh" published by East-West Communication Institute, H. Wail.



Filetab teach-yourself

A teach-yourself course on Filetab, the National Computing Centre's report generator and file maintenance package, is now available from the centre for users of ICL 2803 and 1800 computers and IBM 360 and 370 systems.

The course comprises an audio cassette, an introductory booklet, a workbook, a programmer's reference manual and an applications study guide with 13 practical problems. The workbook has seven sections, each beginning with a test which enables the student to see if he or she already knows enough about Filetab to skip the section.

A one-day workshop is offered to students who complete the course. The course costs £400 and includes five self-study materials. The NCC is at Oxford Road, Manchester M1 7EO, telephone 061-228 6331. A student is pictured left using the Filetab learning module.

Distribution network from H-P

A "BUILDING-BLOCK" approach to distributed computer systems was announced by Hewlett-Packard in Grenoble last week when it introduced its HP Distributed Systems Network concept.

A challenger to Digital Equipment's Decnet system, it consists of new hardware/software that links HP DS/3000 and the new DS/1000 systems, as well as enabling the HP 2028 data entry systems to communicate with the DS/3000.

Functions in the network are layered, or isolated from one another, so that future developments can be added without altering the procedures that users have based on present-day HP networks. Changes can, therefore, be made in one function, such as communications methods, with little or no effect on other functions, such as user applications.

Already there are about 200 HP DSN users worldwide, and the company says that future products will handle HDLC, SDLC and X25 standards.

Redifon grows with Czechs

FORESTRY and timber are one of Czechoslovakia's largest growth industries, says Redifon — and the growing of Czechoslovakian trees is winning the British company growing business.

The country's State Forestry Commission already had two Redifon Seebeck data entry systems, and has just ordered a third, with 32 terminals, for the South-Moravian Forestry Commission, based in Brno. It will be used to prepare data for the new Rjad mainframe on its way from the Soviet Union.

CAD 78 the event for designers

CAD 78 is the third international conference and exhibition on computers in engineering and building design.

Matropole Centre, Brighton, Sussex, UK 14-16 March 1978

- Building design
- Electrical and electronic engineering
- Civil and structural engineering
- Manufacturing and shape representation
- Management and techniques



For details write to Beverly Riddell, IPC Science and Technology, 32 High St, Guildford, Surrey, GU1 1AA. Tel. 0483-71861. Telex: 511111 RIDD.

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Work will be undertaken throughout the North West from our office in Liverpool.

It is unlikely that applicants earning less than £4,000 will be successful. Send details of career to date in complete confidence to:

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details to H. E. Batchelder, Marconi Elliott Avionics Systems Ltd., Elstree Way, Borehamwood, Herts. Quote reference MEA 7019.

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IBM OS VSI
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For further details or advice on these and other contracts still in the pipeline call Sue Smyth, June Moggs or Jane Asbury now on 01-491 4706.

Knight Recruitment

Are you still undervaluing your IBM experience?

We told you a few weeks ago that anyone with programming experience on IBM hardware is in a very strong position these days — especially in the London area. If you still don't believe us, here are two more jobs that prove the point.

Programmer database and IR support group c.£5000

The team you'd be joining in this world-famous insurance organisation helps applications project groups develop and maintain database management and information retrieval systems. Specifically, you'd test and evaluate the efficiency of prototype database designs, help user departments in the use of retrieval languages, and evaluate new software products. You'll need at least two years' COBOL and/or Assembler on 360/370 machines operating under OS. Knowledge of database management techniques would be useful, and you must be prepared for detailed involvement in software products. Location is central London. Ref. JP0066 London

Systems Programmer £5000 + low-cost mortgage

As a member of an advanced technical services group in this young, go-ahead life assurance company, your task would be to help develop software in a DOS/VS, VSAM, GRASP/VS, SHADOW II or LIBRARIAN environment. You'd also advise applications programmers working in a TP/database environment. You'll need at least two years' experience of IBM Assembler. A knowledge of PL1 and TP or database work would be useful. Location: Wembley. Ref. JP0038 London

Stop Press: Top jobs in major UK software house

Here they are — some of the best software opportunities around in Birmingham and Manchester. A major UK Software house is currently on the lookout for DP staff with commercial rather than scientific backgrounds.

These opportunities offer real scope and plenty of challenge with the chance to work either locally or to travel throughout the UK and overseas. Career development exists in the broadest sense — with the chance to move into other companies within the group. DP staff with the right potential could progress into management roles.

Salaries range from £3000 for Programmers to £6500 for Team Leaders. Up to £6500 for Systems Analysts and up to £7000 for Business Consultants and IMS Consultants. All this plus profit-linked bonus, generous travel and accommodation expenses and overtime pay at the rate of 40% over the normal.

The sort of people they want are: **Programmers** — with knowledge of IBM and minimum 2 years' PL1. (COBOL experience also considered.) **Senior Programmers** — 3 to 4 years' experience. **Team Leaders** — with solid experience of program specification and project scheduling. **Systems Analysts** — knowledge of IBM file organisation and 3 years' analysis experience. **Business Consultants** — minimum 5 years' analysis experience.

IBM knowledge and the ability to communicate with DP and non-DP people. Expert knowledge in specific areas essential. **IMS Consultants** — with in-depth knowledge of IMS from a database communications or database design viewpoint.

These positions will not be on our books for long. So get in touch soon. Birmingham

This is only a small selection of our current opportunities. There are a lot more jobs on our books for both men and women. For more details, please phone us on either of the numbers below.

01-491 4706 Knight **021-772 8331**
24-hour answer phone, Midlands Recruitment
Knight Computer Services Limited, 14 Old Park Lane, Birmingham B8 3BD

Knight Computer Services Limited
Staff Services Division of BOC Data Services Group and a member of Computing Services Association

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May 9, 10 and 11, 1978

The third annual specialised exhibition devoted solely and exclusively to small computers, computer peripherals and systems to be staged in Brussels

COMPEC EUROPE in 1977 drew 5,300 visitors from the cream of the computer world. They came from as far away as the USA, Russia, Japan, Finland, Italy, Hungary and Poland — as well as from the great industrial areas of Germany, Holland, Belgium, France and the United Kingdom.

COMPEC EUROPE is sponsored by the leading United Kingdom publications, "Computer Weekly" and "Data Processing", and is organised for them by Illite Promotions. All are members of IPC Business Press at Oorzel House, Stamford Street, London, SE1 9LU, England. Telephone: 01-261 8000. Telex: 26137 BIPSPS G

To: Chris Timmins, Exhibition Manager, Compec Europe, Room 821, Oorzel House, Stamford Street, London, SE1 9LU, England.
I wish to exhibit at COMPEC EUROPE '78 — please send me details.
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Honeywell 6000/60 Level 66 Personnel
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Our client is seeking the following categories of personnel: system software programmers and analysts, applications programmers, operations managers, and GCOS specialists. Applicants should have at least 18 months to 2 years solid experience working with appropriate Honeywell equipment and be fully familiar with techniques and functional aspects. Additional experience of terminals and line discipline would be an advantage. First class opportunity to enjoy a phenomenally well paid assignment in one of the more pleasant areas of the Middle East.

Contact Mike Creamer

Programmers and Analysts

London up to £8,750
A large and well established organisation, installing on ICL 2900 which will include real-time and database applications, has vacancies for programme and analysts at most levels to work on the development of the system. Programmers must have two years experience of PLAN or COBOL (or both) and Senior Programmers would be expected to have a wider background in both software and applications. Knowledge of GII or VME would be a positive advantage.

Systems staff should have a programming background which has been followed by several years in the design and implementation of real-time/database applications.

Training in ICL 2900 will be given where required.

Salaries according to experience. Challenging environment.

Contact Jim Baker

For further information on any of the above vacancies please contact the appropriate consultant. If your qualifications do not match the above positions but you are seeking other opportunities please contact us anyway.

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Team Leader Word Processing

Central London

This is an excellent opportunity for a highly motivated d.p. specialist to work for a well-known and successful consultancy on the design and implementation of a sophisticated Word Processing System. The client is particularly keen to meet someone with around 3/4 years experience of working with Assembler Software, including the specification and building of systems. Essential attributes will be creative thinking, up to date knowledge of mini computers and software developments and the ability to control a team of professional staff.

First class product, generous salary and superb prospects.

Contact Margaret Stevens

Minicomputer Programmers

Home Counties

Our client, a leading Systems House in this country, has requirements for programmers to work on the development of sophisticated real-time applications.

Candidates must have at least one year's experience for junior positions and several years for the more senior vacancies. A background of mini/micros using Assembler, CORAL, FORTRAN is ideal. Knowledge of software such as linkers, loaders, cross assembler would be an extra advantage.

These are excellent opportunities to work in a professional environment. Salaries negotiable according to experience.

Contact Jim Baker

Programmer Analyst

West of London - U.S.A.

This manufacturer of technical micro-based business systems seeks a presentable and qualified person with M/CODE and ASSEMBLER experience and a background of micro-processor (or mini) based systems, together with recent involvement of both terminal hardware and communications software. Work involves a lot of customer liaison, occasional visits to the U.S.A. and possibly, later, world travel.

Relocation assistance and excellent salary for the right person.

Contact Mike Creamer

MANAGEMENT & EXECUTIVE SELECTION

COMPUTER WEEKLY, November 17, 1977

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Five years ago this software house set up with the prime objective of creating a business based on quality of work. Without doubt they have succeeded. The result has been a substantial growth and diversification, most recently in the rise of the mini computer system division. They concentrate on commercial and T/P systems run mostly on DEC, Data General and Hewlett Packard machines. It is into this section that they wish to recruit a senior consultant. The work will involve both pre-sales hardware and software evaluation, analysis, design, costing, proposals, writing and demonstrations, as well as post-sale implementation and maintenance. Previous project management experience on commercial or T/P mini systems is essential. The highest standards of personal presentation and work output are necessary to maintain their reputation for good customer relations. But all this is well rewarded, for the company knows that its success depends on its people, and does everything in its power to keep them happy.

Contact Pam Quinlan

PROGRAM TRAINING

£6-6½K

CENTRAL LONDON

This is your chance to break out of programming and to become actively involved in training. Our client, a multi-million international oil company, require someone to set up and give a new training schedule. What they require is not an experienced lecturer, but a top flight structured COBOL programmer, to pass on his valuable experience to the in house programmers and to set up standards in training techniques, implementation documentation. The rewards for the job are those expected of such a prosperous company.

Contact Pam Quinlan

PROGRAMMERS to £5,200

CENTRAL LONDON

COBOL programmers with at least 18 months' experience, preferably on IBM equipment, are required by our client, one of the largest bureaux in the country. This well established company has been increasing the size of its existing business and range of products despite the recent recession and now requires experienced people to assist with development and enhancement. Structured programming techniques are being used and training will be given where necessary.

The company also offers many fringe benefits and excellent career prospects.

Contact Rowland Middleton

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to £5½K

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Join an expanding mini and micro computer manufacturer. The successful applicant will work under the direction of the Production Engineering Manager in the planning and direction of production engineering activities with regard to new and existing products.

Responsibilities will include the release of all new products into the manufacturing department; the continuous monitoring of existing products for improvements in design, cost and manufacturing methods; the setting up and control of the use of standard components and parts within the company's products and the establishment of an advisory and technical support service to the manufacturing unit.

Applicants should be a minimum of 25 years of age, hold an HNC in electronics and have five years' experience as a production engineer in a company manufacturing electro mechanical devices.

Relocation expenses will be made available where necessary.

Contact Peter Gorton

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Requirements for these positions are a minimum of two years' low-level programming and an ability to communicate at all levels. Applicants must also be able to work on their own initiative and become involved with all aspects of a customer's system.

Both positions offer a wide variety of work and good career prospects within an expanding company.

Contact Rowland Middleton

DATABASE ANALYST £6½K

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In order to qualify for this attractive job it is essential that you have had at least one year designing systems in IMS database, and previous to that a substantial programming background, preferably in OL/1.

In 1978 our client, a major oil company, plans to implement vast communications and database systems, and if you are suitably qualified require you to develop and implement the database. This is the right industry to move into if a successful and lucrative career is your goal.

Contact Rowland Middleton

ANAL/PROG
CRAWLEY

£5K

This is a marvellous opportunity to develop your career away from the mad rush of town. Our client requires an Analyst/Programmer with experience of ICL 1800 or 2903/4 to design and develop commercial systems.

The successful candidate will have a minimum of two years' systems experience, having been involved in the design and implementation of at least one major system. He/she should also show the necessary maturity to progress to a management position.

Both the working environment and the benefits are truly excellent, including a mortgage subsidy scheme.

Contact Gareth Bennett-Coles

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The international division of this highly successful mini computer manufacturer has attained outstanding results in its drive into Europe, the Middle East and Africa.

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Contact Peter Gorton

Duncan Bransom Recruitment

PROGRAMMERS
up to £5,500

A major development programme at UNILEVER COMPUTER SERVICES LTD. (UCSL) means that they need the services of two experienced programmers - one to work on mainly PLI projects and the other for Cobol.

The systems will be developed to operate on IBM and ITEL mainframe computers through terminals or non-IBM minis front-ending to them.

Applicants should have had at least two years' programming experience preferably under OS.

The company's staff development scheme will ensure that those with the necessary ability and energy will be able to make progress either into new fields of specialisation or into the management of the company.

If you would like to be considered for one of these jobs or would simply like to talk about them, Roger Griffiths of Duncan Bransom Ltd. will be at UCSL's Head Office at Station House, Harrow Road, Wembley, Middlesex - telephone 01-903 1414. Why not drop in to see him or telephone him there any time from Monday to Friday, 21st - 25th November, inclusive, between the hours of 8.00 am and 7.00 pm. Interviews can be arranged while you wait.

After the 25th November, please contact him at the Duncan Bransom office at 37 Hillcrest Road, Loughton, Essex. Telephone 01-508 5121.

Please write or telephone for an application form to:
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37 Hillcrest Road, Loughton, Essex
Telephone 01-508 5121

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- ★ a minimum of 3 years' programming experience
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- ★ supervisory experience
- ★ some experience of program design

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- ★ 2 years' + programming experience
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- ★ ability to progress in supervisory roles

You should have gained a sound commercial understanding, preferably in an IBM environment. Career progression is excellent, so too are the working conditions. Attractive fringe benefits include season ticket loan scheme and concessionary discounts on Company products.

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Freepost 6, 102, Blandford Street, London W1E 1JZ

REF: CW/11/16

SCA Computing Services Association

Duncan Bransom Recruitment

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Career Development

After an initial period for adjustment to your new surroundings, you will begin assignments that will progressively stretch you. You will be encouraged to accept greater responsibility and to seek promotion through the various grades. Training and guidance will be given at each such change, the objective being to help you make progress while the Company gets the benefit of your ever-increasing expertise. Promotion to management posts within the company follow the same pattern, and your rate of progress will depend only on your own ability.

Other opportunities for the development of your professional career could include a transfer to one of the other UCSL divisions e.g. Micronics, Time-sharing, etc. Alternatively there are career possibilities for those who may wish to move to other parts of the Unilever Group itself.

The Work

The work consists of analysing designing and installing systems. Clients may be within the Unilever group of companies or completely outside it. Projects vary in length from two months to two years. It will be your responsibility to see a project through from start to finish. When that is finished then there will be another one behind and another one behind that and so on You will also be expected to look after your client and make sure that he is satisfied with the service provided — a role not unlike that of the data processing manager himself.

Systems are run on UCSL's IBM and ITEL mainframes through terminals or minis front ending to them.

How much experience is necessary?

With about two years' programming followed by two years' significant systems experience, you could find yourself taking charge of projects straight away. With more experience you would handle bigger or multiple projects.

Has it got to be I.B.M.?

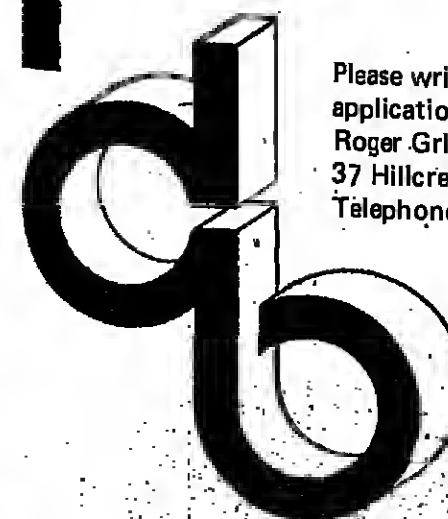
Your previous experience does not necessarily have to be on IBM equipment but those applicants with significant IBM experience will be able to fit into the working environment more quickly. This will obviously give them an edge over those who have not.

Further Information, Application Forms, Interviews

If you would like to be considered for one of these jobs or would simply like to talk about them, Roger Griffiths of Duncan Bransom Ltd. will be at UCSL's Head Office at Station House, Harrow Road, Wembley, Middlesex — Telephone 01-903 1414. Why not drop in to see him or telephone him there any time from Monday to Friday, 21st — 25th November, inclusive between the hours of 8.00 am and 7.00 pm. Interviews can be arranged while you wait.

After the 25th November, please contact him at the Duncan Bransom office at 37 Hillcrest Road, Loughton, Essex. Telephone 01-608 5121.

Please write or telephone for an application form to:
Roger Griffiths, Duncan Bransom Ltd.
37 Hillcrest Road, Loughton, Essex.
Telephone: 01-608 5121



Duncan Bransom Limited

154

Business development in the Middle East

لوجيكا

Logica, one of Europe's leading computer services companies, is continuing to expand its activities in the Middle East. We are currently working on major projects in Iraq, Libya, Saudi Arabia and Kuwait.

We are looking for a senior person to head up Logica's marketing and sales in the Middle East. This is a new post within Logica's recently established Middle East Operation and offers exciting opportunities for someone who wants to get in on the ground floor. The right person should have a successful record in sales and marketing preferably in the computer services field, and must have proven experience of international business development ideally in the Middle East. A good technical background and the ability to communicate at all levels on Logica's range of services especially in the areas of commercial data processing and management systems is important.

The assignment will involve the development and the implementation of marketing plans, advising on bidding strategies, preparation and negotiations of contracts and assisting and advising our technical staff in the preparation of proposals.

The post is based in London with extensive travel to the Middle East. Knowledge of Arabic would be an advantage. There is a very good salary with fringe benefits including Life Assurance and Pension Scheme.

If you want a challenging job and are capable of working with highly professional computer people call Kathleen Scott on 01-637 9111 or write, using Freepost and quoting reference ME0/1 to:

Logica Freepost
64 Newman Street
London W1A 4SE

Retail Business Consultants

Join our rapid growth in Point of Sale computer systems

ICL are totally committed to Point of Sale retail systems, and are well on the way to becoming market leaders.

You will be involved in our development of new and existing products that will take us far ahead of our competitors. Our understanding of customers' retail business requirements is of prime importance, and we will expect you to have achieved proven success in the application and implementation of retail POS systems.

You will be familiar with current small business computer developments, especially distributed processing systems as applied to the retail trade. This will enable you to ensure the successful early

implementation of ICL's new POS systems for selected customers around the world. You will be based in Feltham, Middlesex, but will be working extensively in different parts of the UK and abroad.

If you have all the experience we require you can play a significant role in this exciting development, with a starting salary in excess of £6000. Retention assistance can be given where appropriate.

For further information please contact Tony Fuller or David Atkley at Small Systems, Central S & IS, ICL, Forest Road, Feltham, Middlesex; tel. 01-891 1414 ext. 387 or 227. Please quote ref. CW1590.

International Computers

think computers - think ICL

ICL

MODCOMP

SOUTH OF ENGLAND
N.W./LEEDS
MIDLANDS

CUSTOMER SERVICE ENGINEERS

Modular Computer Services Inc., an American mini-computer manufacturer, has vacancies in each of the above areas. Candidates should have at least three years experience in Customer Service Engineering plus a good working knowledge of mini-computers, process control and communications systems. An excellent salary, company car and non-contributory pension and medical benefits are available for the right person.

Please write, giving brief details to:
Mrs. V. Thomson, Personnel
MODULAR COMPUTER SERVICES INC.
Export House, Woking, Surrey
Tel. Woking (04882) 71471

Expansion Brings Opportunities with Scott Meat Products in Blatchley, Bucks.

Scott Meat Products, part of the Scott Brothers Group, is recognised as being a leading European company in the cooked meat industry and is conveniently located at Blatchley in Buckinghamshire. Our computer function plays an important part in our day-to-day operations and will become more vital to us in the future. We are about to carry out a major expansion of our data processing facilities and plan to install a 2500 series computer with on-line facilities representing a significant new phase of computer development. In this context we wish to recruit the following personnel to join our team of analysts and programmers:

COMPUTER PROGRAMMER

Educated to 'A' level with a minimum of 1 year's COBOL experience on ICL equipment. Salary in range £3300 to £3800.

TRAINEE/JUNIOR SYSTEMS ANALYST

Preferably a graduate, seeking a career in computing which will be demanding and challenging. This salary will depend on experience.

Successful candidates, who can be either male or female, will be involved in the development of on-line production and material control systems.

Please write giving brief career details to —
Mr. A. Gillham, Personnel Dept.
Scott Meat Products
Blatchley, Milton Keynes, Bucks.

SCOT
COOKED MEATS

SYSTEMS ANALYST Liverpool

Salary

£4000-4500

Owen Owen, the rapidly expanding department store group, are looking for a Systems Analyst to work on a wide range of projects using a Honeywell 64/20. You should have a successful record of 12 months systems experience, combined with the ability to communicate at all management levels.

Owen Owen offer attractive fringe benefits and the promotion prospects are excellent.
Apply to: Mrs. C. Reid
Group Personnel Manager (Management)
Owen Owen Limited
Central Personnel Department
P.O. Box 145
109 London Road
Liverpool L69 1BD

OWEN OWEN

ANALYST/ PROGRAMMERS

£

CMG will pay you what you are worth

We pay high salaries because we expect you to shoulder a lot of responsibility.

Telephone or write for an application form, to:
Janet Gothard
CMG (West End) Ltd
Sunley House, Bedford Park
Croydon CR0 2AP
01-686 8251

COMPUTER SYSTEMS ANALYSTS

For the RAC's Head Office at Croydon

The Systems Department of the RAC requires two Analysts with experience of main frame systems development or small machine projects (Burrughs B 800 experience preferred), to join special project teams within the Department.

The RAC is a relative newcomer to Systems organisation. The Department, although still fairly small, is at present undertaking a fairly heavy work programme. This is a green field situation offering rare scope in an unusual commercial environment.

Many of the problems that will confront you will be unique to a motoring organisation. For example, one of the present tasks is to centralise and computerise a payment system involving 750,000 members.

Experience with COM would be useful. It should be emphasised that the need is not for theoreticians, but rather for two practical, down-to-earth computer people who are prepared to roll up their sleeves and tackle unusual problems realistically.

You might be a Business Analyst at present, perhaps with some exposure to a bureau environment, but anxious to become heavily involved in the challenging problems offered by a specialist organisation.

The salary offered is around £4,700. Please apply in writing, giving career details and experience, to:

Mr R. Wassberg
Systems Manager
Royal Automobile Club
RAC House
London Road
Croydon, Surrey.

RAC

COBOL COMPUTER PROGRAMMING INSTRUCTOR

£5,000 +

Why not put your programming experience to good use teaching others? Sound knowledge of Cobol programming is essential and previous experience in teaching is desirable. Make an appointment to come and see us by phoning Steve Grosse on 01-492 1841.

SENIOR SYSTEMS ANALYST SOFTWARE LECTURER

GEC Computers Limited manufacture and market the GEC 4000 Series of advanced Mini-computers which feature operating system facilities programmed into the machine hardware. SENIOR SYSTEMS ANALYST to join a team of analysts who provide technical support to the Sales Force. He or she will be expected to become familiar with our hardware and software products and use this knowledge to:

- respond to Customer's operational requirements
- support Sales Engineers during customer visits
- make technical presentations

Must have experience of minicomputers and peripherals, computer languages, operating systems and commercial applications. SOFTWARE LECTURER to support the staff of the Computer Education Centre, which trains the Company's customers and internal staff. Candidates will have experience in computing and teaching, will build up a thorough understanding of the current and future software products marketed by the Company and be able to impart this knowledge to others. A Commercial Programming background would be useful. Competitive salaries are offered and the fringe benefits are those normally associated with a large organisation.

Please apply in writing or telephone
Mr. O. F. Wells, Personnel Department,
GEC Computers Limited, Elstree Way,
Borehamwood, Herts.
Tel: 01-953 2030, Ext. 3697

GEC Computers Limited

SBC

Sales Executive — £12,500 p.a.

On sale every eight weeks

BASIC/FOUR is probably the most successful real-time, disc based small business system in the market place world-wide, with more than 4,000 installations. Now we offer you the chance to help repeat the success in the UK. You will have all the advantages synonymous with a small company, where your contribution really counts, with all the big company benefits: Private Scheme, BUPA, Company Car, good

basic salary plus the total back-up support from BASIC/FOUR'S international organisation. This really is an outstanding opportunity for the Sales Executive who has proved his ability to sell in this area to exploit this ability to the full.

Contact:
RICHARD MARLER
BASIC/FOUR (UK) LTD
43 THE VALE, ACTON, W.3
01-749 0118

Computing Services

Computing Services

Computing Services

TO £5,600 SYSTEMS ANALYST London E.C.

Development of commercial data processing systems. Good experience in programming and/or hardware/software and on line systems design IBM 370 installation.

TO £5,600 PROGRAMMER ANALYST Middlesbrough. Four years DP experience required, with two years COBOL programming included, for the development of general applications software.

TO £5,600 ANALYST PROGRAMMER Surrey. Looking for someone who has already implemented at least one major system, our clients have a Honeywell installation. Programming is in COBOL, on line systems employ database structures.

Many more unadvertised positions
COMPUTECH SYSTEMS & PERSONNEL
188 Finchley Road, London, NW3 9HP

COMPUTECH 01-794 0202

GIBSON

Computing Services

MINI MICRO COMPUTERS COMMERCIAL SALES APPOINTMENTS

INCOME RELATED TO TURNOVER
£10,000/£25,000

We have been appointed O.E.M.s for possibly the most commercial manufacturer/supplier of Real-time Mini & Micro computer systems in the UK. These appointments are for sales personnel with a proven record of selling experience in some of the following:

Mini Computers
Bureau sales
V.R.C.

Micro Computers
Mainframes
Terminals

Income is on a commission only basis (probably the highest in the industry) full product training will be given by the manufacturer. The company will pay further commission on achievement targets.

It is envisaged that a successful salesperson will be offered a partnership in the company. If you can meet this challenging appointment, write including a brief resume to:

GIBSON COMPUTING SERVICES
12 ADELPHI ROAD, BRAY, DUBLIN, IRELAND

A career move & a better life in the West of Ireland

Digital Equipment International Ltd. in Galway is a subsidiary of the world's largest mini-computer manufacturer. We employ in excess of 38,000 people world wide with over 1,000 at our principal manufacturing plant for Europe at Galway, in the West of Ireland.

The success of DEC products has led to a continued growth so we now need to develop our EDP division. We are currently looking for a Project Manager and experienced Programmer Analysts to add to our team of over 30 EDP professionals who operate one of the most powerful data processing installations in Ireland. This consists of a large time sharing DEC System 10 mainframe as well as PDP11 minis, providing on-line facilities to over 60 in-plant terminals and to our other European manufacturing plants.

We are also part of Digital's Data Communications Network which currently stretches from Geneva in Switzerland to the West Coast of the USA. The system is used for a wide range of sophisticated applications covering manufacturing, material control, purchasing, order processing, financial and administrative areas.

PROJECT MANAGER

This is a challenging role offering real responsibility and high rewards for an ambitious DP professional. You should have experience in the implementation of at least one large system in COBOL and preferably have some supervisory experience.

You will be involved in updating existing systems, presenting to management and implementing new systems.

You should have at least 2 years' experience in systems and programming using COBOL on any machine.

Salaries for the positions are very attractive and conditions of employment are those to be expected from a major progressive company and include full relocation expenses.

If you are interested in any of the above positions, then telephone or write for an application form to: Patsy Cooney, Recruitment Manager.

P.S. Our expansion means that we have an ongoing need for experienced DP professionals. We expect to have a number of openings during the next 6 months so if you would like to be there in our success then contact us now!

digital

DIGITAL EQUIPMENT INTERNATIONAL
Industrial Estate, Ballybri, Galway,
Tel: Galway (091) 7651

If you like the sound of us.

We started in computer services 5 years ago, just four of us. Now we're 15 times bigger, still growing, working throughout the UK and Europe - consultancy, turnkey systems, software, contract services.

Our increased size hasn't made us less human. People like working here. Maybe because we give every opinion a chance, try always to do a good job better, and we pay well for those who think the same way.

And this sounds like you.

Systems analysts. (We need 3.) Your background includes planning and implementing commercial systems, preferably using TP and/or Database disciplines.

Analyst/Programmers. (We need 2.) You have thorough knowledge of IBM 370, preferably in an Assembler or PLI environment.

Programmers. (We need 4.) You're experienced in two of these four languages: Assembler, COBOL, RPG, PLI.

If you're right for us, we'll top whatever you're earning now. If you want to be with an energetic company that can only go ahead -

Get in touch.

Hill Price Davison Ltd, Walham House,
Walham Grove, London SW6 1QP. 01-381 3266.

GRADUATES!

Here is the opportunity you have been waiting for

GRADUATE/TRAINEE PROGRAMMERS

SALARY CIRCA £3,000

Our client, based in the West Midlands, is a well-established, multi-million pound company, who are utilising latest computing techniques.

They offer successful candidates the opportunity of gaining sound commercial experience within a friendly, professional environment, assisting in the development of several major new projects within the Computer Services Department.

Applicants should have a minimum of two 'A' Levels, but preferably have an HND or relevant computing qualification and possess a good personal manner and presence. The company offer excellent benefits including pension and life assurance schemes, subsidised lunches, sports and social facilities, etc.

Contribution towards relocation expenses is available where appropriate, therefore make a move in the right direction and contact:-

ROD BEESON

On 021-236 3781

Ref CW/11/17

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST

Freeport, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0476 FREEPOST

Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0471 FREEPOST 6

Freeport 6, 102 Blandford Street, London W1E 1JZ

SCR

Italy

We need several experienced Computer Professionals to work on projects with our Clients in Northern Italy. You must have:

- * **at least 2 years programming experience.**
- either * **practical experience of HONEYWELL LEVEL 66 equipment in the systems software or communication areas.**
- or * **micro-computer experience at the software/hardware interface level on INTEL 8080 or equivalent.**
- or * **programming experience on the more common mini-computers, together with a working knowledge of Italian.**

The total salary package will be very attractive to people at the moment working in the United Kingdom. Interviews will be held in London, for appointments early in 1978.

Please write, initially to:

**J. A. Taylor, Resources Manager,
SPL International,
12/14 Windmill Street, London W1P 1HF
or telephone 01-636 7833**

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TESCO CHECKOUT IBM 370/3032 + 370/3031

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NEW HARDWARE WILL INCLUDE
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MEMORY 10 MEGABYTES
102,000 MILLION BYTES OF 3850 MASS STORAGE
3800 LASER PRINTERS
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Another first for Tesco - the latest IBM Hardware. That's what being the national leader in multiple retailing means.

For experienced Systems Analysts and Programmers, no other multiple retail company can offer this kind of advanced environment.

Our development programme includes all necessary training to transfer to this new environment. We are therefore able to offer positions to experienced staff with ICL, IBM or other backgrounds.

You will have the advantage of being based at our modern Head Office building in Cheshunt which has easy access to public transport and attractive green belt countryside. Where appropriate we'll help you with re-location expenses and you will have the other Tesco advantages of subsidised staff restaurants, BUPA scheme, contributory pension scheme and excellent sporting and leisure

facilities at the Tesco Country Club.

These are equal opportunity vacancies and you should apply by completing and returning the coupon, or Phone: Waltham Cross 32222 ext. 3175

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POSITION APPLIED FOR	
SALARY REQUIRED	
LANGUAGES	
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<p>Checkout your future career with</p> <p>TESCO</p>	

CONTRACTS

HOLLAND

IBM - OSVS1 - Systems Programmers

SWITZERLAND

PDP - Assembler - RSX11/M } German Speaking
NCR - Century - NEAT3

GERMANY

Siemens Tele Processing - German Speaking

U.K.

London

IBM - PL1 IMS DB/DC - Specialist
IBM - Cobol OSVS1 - Instructor
IBM - Assembler - DOS/VS
IBM - PL1 CICS or VMCS
IBM - Sys3 RPG2

Essex

PDP 1100 Basic + RSTS/E (3 vacancies)
IBM - PL1 DOS/VS
IBM - Assembler - OS Engineering
Univac-Cobol Exec8
IBM - Sys3 RPG2
ICL - 2803/4 - Senior Analyst - On-line experience
ICL - 2803/4 - Cobol - On-line experience
IBM - DOS/VS - Operations

Surrey

B17-6700 - Cobol MCP (8 vacancies)
PDP - Fortran - Macro11 - RSX11/M

Other Areas (within the U.K.)

Systems Engineers - Avionic and telecommunications experience
U1100 - Cobol - Exec8
PDP - Macro11 - RSX11 - System Designers

We are always looking for permanent and contract staff, therefore if you want more information about any of the above U.K. contracts ring Stephen Trigg or for the overseas contracts end permanent poste ring John McLean on

BRENTWOOD (0277) 212021

At the same time we can tell you about other requirements we have at present, which may be just what you are looking for. Alternatively send your C.V. to P.O. Box 74, Brentwood, Essex CM16 0X.

Computer Systems LINSOTT

PERMANENT PROGRAMMER/ANALYSTS (urgent)

If you have three or more years experience of the IBM 360 or 370 series, together with some Analysis work, then you could be an ideal candidate for enhancing current development work being undertaken by our clients. Phone now for details.

Junior Systems Programmers

IBM DOS end/or DOS-VS expertise in this fast moving field could, land you in the job you've always promised yourself. Don't hesitate, pick up the phone and fix yourself an interview now!

Programmers to Project Leaders

Our client, a large multinational seeking to develop sophisticated financial control systems, has embarked upon an imaginative development program which requires top quality staff. If you feel you have the relevant experience and are of the right calibre, then regardless of your machine disciplines please telephone us now and you'll never regret it!

Systems Designers

IBM DOS/VS with PL1 or BAL experience is what is needed to succeed in this dynamic environment. Design experience is of course very helpful! Our client, a fast expanding financial concern is eager to meet enthusiastic practitioners of this subtle science!

Programmers Systems Programmers

If you have good IBM BAL experience under OS VS1, and are seeking to reduce your commuting costs then our client would be very interested in hearing from you immediately. Take a short cut to the top phone Linscott now!

Software Professionals

Are you:

A Compiler Writer? Assembler
Specialist? Systems or Software
Programmer? Software Architect?

Contact Linscott now if you want:
Security, High Salaries,
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£2K to £4K

Essex
£4.5K to £5.5K

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Essex
c. £4K

Ref. 4CWN18

Essex
£4K to £4.5K

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Herts
& HGR

INTERDATA

Project Leaders in Compiler Development to £7,500 p.a.

INTERDATA is continuing to expand its U.K. based Software Development Group, a small but expert team of product development professionals with a major share of the responsibility for continued rapid growth of this key unit of Perkin-Elmer Data Systems.

The group is about 30 strong, located in Slough, and combines a friendly and informal working environment with high professional standards and a reputation for enthusiasm and commitment.

At the moment we have a particular requirement for Project Leaders in Compiler Development, especially for COBOL. The qualities we are looking for include:

- A sound working knowledge of COBOL or RPGIII.
- Significant experience in compiler development, preferably acquired with a manufacturer or software house.
- Team Leadership experience - and a taste for more.
- A desire for real responsibility for key company products.

We offer:

- Salaries up to £7,500 p.a. for the right calibre of applicant.
- Opportunities for rapid promotion in an expanding group for successful applicants who demonstrate an ability to handle wider responsibilities.
- The opportunity for occasional trips to the U.S.
- Relocation expenses where appropriate.
- The usual company benefits, including pension and health insurance.

If you're interested, call or write to Len Barlow giving your career details.

INTERDATA LIMITED
227 Bath Road Slough SL1 4AX
Telephone Slough 34511

Programmer to move into Systems Northampton - c. £4,500

Our client is part of a major international group and supplies a quality engineering product to customers world-wide.

A Programmer is required to join the company's small, data processing department and actively assist in the specification and implementation of new systems.

Applicants, male or female, will be expected to have had at least 18 months' experience using COBOL in a commercial environment.

Ideally on IBM equipment. They must be able to work with a minimum of supervision and to communicate effectively at all levels. In addition to a starting salary of c. £4,500 a full benefit package will be offered.

Please write in confidence with full details of your experience to M. J. Rudkin, Moxon Dolphin & Kerby Ltd., 60 St. Martin's Lane, London WC2N 4JB. Please quote ref: 070/MR/CW.

**MOXON
DOLPHIN
& KERBY LTD**

MANAGEMENT SELECTION

DATA PROCESSING MANAGER (Male/Female)

CENTRAL LONDON

c. £5,000

A leading publishing company has ordered an ICL System Ten 220 and requires a DPM to install, set up and run a Publishers Accounting and Distribution System (PADS). Further systems including communications are planned. Applicants should have experience of System Ten and ideally the PADS package.

Please apply in writing to the Company Secretary, Mitchell Beazley Limited, Arleta House, 14-16 Menette Street, London, W1V 6LB.

SYSTEMS/BUSINESS ANALYST

Enfield

A medium-sized manufacturing company, part of an international group, specialising in electronic components and equipment, have a vacancy for a Systems/Business Analyst.

Reporting to the Departmental Manager the successful candidate will carry out systems investigations and designs in the production areas of the company. Production Control and Material management experience are considered as important as Computer knowledge. Candidates must be able to communicate effectively both verbally and in writing with both line management and shop floor staff.

Please apply in writing to:

Mr. G. A. Allen
BELLING & LEE LTD.
Great Cambridge Road
Enfield
Middlesex

Two Interesting Opportunities

Our Clients are a leading U.K. manufacturing group operating both in the home market and overseas with a turnover in excess of £350M. They are looking for young, dynamic staff to join their expanding data processing organisation with offices in London (Victoria) and Bromley, Kent. Their equipment already includes an IBM 370/158 computer supporting a telecommunication network embracing a number of mini-computers, on-line visual display units and remote job entry terminals. This computer complex supports five Divisions of the Group as well as a number of outside customers.

Assistant System Analyst

Circa £5,000

London (close to Victoria Station)

This is an excellent chance for an experienced programmer or programmer analyst to join a team of sixteen system analysts working on accounting systems, engineering projects and marketing information. This team is about to embark upon the development of a large distributed processing project.

PL1 Programmers

Circa £4,500

Bromley, Kent

Here the opportunity is to join a team working on a range of commercial applications and about to develop distributed processing system. You will need to have PL1 experience in a O.S. commercial environment and you will recognise the advantage of ON-LINE PROGRAMMING. Preferably, you will have a degree or an equivalent qualification.

Both posts offer flexibility of work content and a well defined career path. Amongst many attractive benefits there is a profit sharing bonus and other benefits normally associated with a large industrial group. For discussion on these opportunities, please contact the Advising Consultant quoting reference number 311/1.

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.
01-353 6187 (Office Hours)
01-353 1436 (Answerphone Service)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

Birmingham System Support Analysts

Up to £5,500

+ Car, Bonus, Benefits

Our Clients, one of the World's leading manufacturers of Computers, are now recruiting to meet a continued expansion within the U.K. They are particularly looking for support staff to back up their dynamic sales division on marketing technically advanced stand-alone computers, mini-computers and teleprocessing equipment.

We have been retained to look for ambitious men or women with the following qualifications:

- Suitable manner, demeanour and personality to work in a sales environment.
- In-depth software experience, preferably in ASSEMBLER languages/COBOL/FORTRAN, and knowledge of operating systems.
- General hardware knowledge.
- High degree of personal motivation and initiative.
- Preferably a Degree, HNC or equivalent.

Desirable, but not essential, additional experience would be that you have worked with a computer manufacturer in a systems support role, as would experience in such areas as data base, data communications, etc. These are exciting and rewarding opportunities to join a fast growing company. Our Clients not only offer the usual benefits associated with big organisations but also have an extremely attractive bonus scheme. For further information please contact the Advising Consultant quoting the appropriate reference number 311/3.

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.
01-353 6187 (Office Hours)
01-353 1436 (Answerphone Service)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

Scotland Sales Executive Computer Systems

Aberdeen/Dundee

Quota Earnings Circa £11,000

Basic Circa £5,500

Plus Initial Guarantee

Plus Company Car

Our Clients are one of the World's largest and most respected manufacturers of computer systems with a product range encompassing stand-alone processors to full distributed intelligence. Despite their overall aggressiveness, the Company balance sheet management is conservative and their controls are excellent.

Continued expansion in the U.K. has created this additional requirement for an experienced sales executive. Candidates will have a successful track record in selling computer systems against quota, be self-motivating and able to work autonomously. They will also possess the ability to sell the range of fully compatible systems in a variety of operating environments including:

- Commercial data processing.
- Communications
- Education.
- Distributed processing.

Interviews will be held in Aberdeen on Thursday, 24th November, and applicants should telephone the Advising Consultant for further details.

Reference 311/2

HUTTON EXECUTIVE SELECTION LTD.
HUTTON HOUSE,
HUTTON STREET, LONDON EC4Y 8HP.
01-353 6187 (Office Hours)
01-353 1436 (Answerphone Service)

Hutton
SPECIALIST RECRUITMENT CONSULTANTS

Fine Art Auctioneers

Senior Programmer

£5,000 +

London, W1

Our Client is the foremost firm of Fine Art Auctioneers in the World with sales of over £100M. The computer department was formed in 1973 with the introduction of a Burroughs B2700 and now has 20 members.

The continued growth and increasing sophistication of the business have created the need for further systems development and the appointment of a Senior Programmer is crucial to the success of this. Apart from development work, you will assist in planning the programming effort, setting realistic target dates, maintenance of existing programs, in-house training and liaising with outside programming personnel.

In addition to at least two years' practical experience of COBOL, you should have a confident, outgoing personality and either proven or potential leadership qualities, together with enthusiasm and career ambition. Burroughs experience and a good academic background would be useful but are not as important as the other requirements mentioned.

For a discussion on this interesting opportunity, please contact the Advising Consultant quoting reference number 311/4

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Specific diagnostic experience is not essential but previous hardware and/or software experience is expected.

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Essential to this organisation are the extensive computer facilities which provide researchers with a comprehensive service. This involves development work on large computer networks; real time systems and programming languages. Opening for computer programmers and systems analysts exist, or are expected, at a number of establishments, mainly in the South of England. Training will be given to suitable applicants who do not have computer experience.

Candidates must have, or obtain in 1978, a degree, HNC or equivalent qualification in Mathematics, Computer Science, Physics or another appropriate discipline.

Appointment will normally be as Scientific Officer (£2690-£4030) or Higher Scientific Officer (£3740-£4975), exceptionally as Senior Scientific Officer (£4700-£6300), depending on age, qualifications and experience. Starting salary may be above the minimum at each level. There are promotion prospects and a non-contributory pension scheme.

For further details and application form (to be returned by 19 December 1977) contact Miss E. M. Piper CM(S)1b3, Ministry of Defence, Sevoy Hill House, Sevoy Hill, London WC2R 0BX. Please quote ref: SA/37/F.

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The success in U.K. of Honeywell Information Systems Ltd. Distributed Systems Environment programme has created an additional vacancy for a Network Planning Consultant in our Technical Strategic Planning Department of our Customer Services Division.

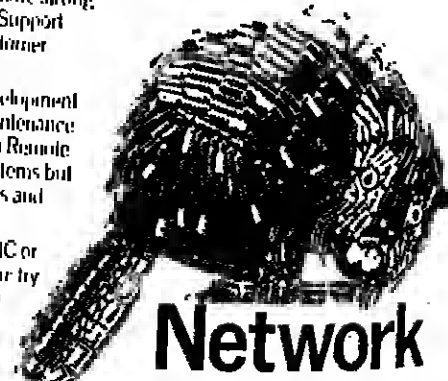
The Technical Strategic Planning Department work very closely with other departments at international level with Honeywell. We have strong influence on the Maintenance and Support Strategies and policies of the Customer Services Division.

The duties will involve: Research, Development and Implementation of Advanced Maintenance Techniques with special emphasis on Remote Fault Diagnosis of all types of D.P. Systems but with special emphasis on Networks and Distributed Systems.

Ideally you should possess ONC, HNC or equivalent and have 5 years in D.P. industry preferably with a Major Main Frame Manufacturer with at least 2 years involvement in Data Communications.

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Please telephone or write to Mrs Janet Field, Personnel Department, Honeywell Information Systems, Great West Road, Brentford, Middlesex. Telephone 01 838 9191



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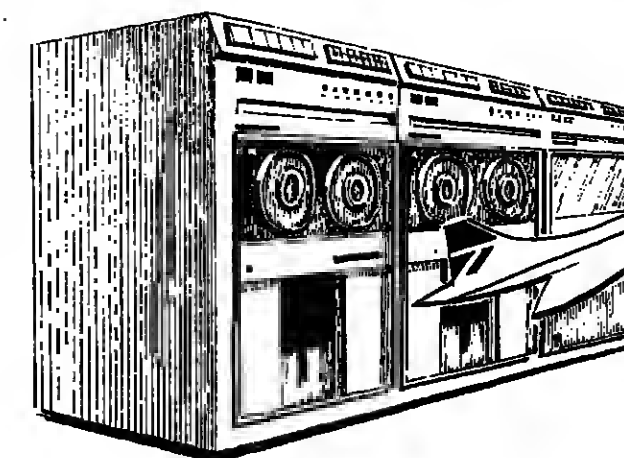
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NEW SYSTEMS DEVELOPMENT

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OPPORTUNITIES

We need high flying systems and computer people with experience in one or more of these areas.

Specifically we need:

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- * About 3 years' good relevant experience.
- * Successful implementation of at least one major system.
- * Management potential.
- * Relevant applications.

ANALYSTS

- * About 2 years' experience.
- * Sound general education and systems training.
- * Understanding of commercial systems requirements.

PROGRAMMING TEAM LEADERS

- * Proven leadership ability.
- * Sound relevant technical experience.

SENIOR PROGRAMMERS/ PROGRAMMERS

- * 2 years' experience in computing.
- * Experience with minis or real-time systems.

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S.C.R. is retained by Thomas Cook Group Ltd., specifically to recruit for the above positions. All applicants should apply directly to S.C.R. who are conducting the initial interviews.

CONTACT REG HEATH

021-236 3781

REF. NO. CW/11/13

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• **VARIETY** — including liaison with users; entry of systems to database; handling input, processing and output; changing magnetic tapes and discs; preparing and storing archive material, etc.

• **DAY & EVENING SHIFT ONLY** — Monday/Friday, 7.30-15.30, 12.30-20.45 (normally no shifts on weekends)

Candidates should be 22 or over, with at least four 'O' level equivalent, be capable of working with minimal supervision and have held at least one operations post.

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German language essential together with IMS database exp. — Technical background — vacancies at all levels: would consider contract staff

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Knowledge of ASSEMBLER & FORTRAN & pref. CORAL — scientific prog. — systems design and real-time exp. or graphics + PDP11 — to set up and manage a software support team.

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This is a chance to broaden your experience in an installation comprising three large IBM machines running on-line and batch systems using DOS/GRASP and CICS. New equipment and software to be installed next year means good promotion prospects for the people who join now.

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The requirements

Applicants should be less than 30 years old and should have accepted 3 shift working, 5 days a week, as a way of life.

For the senior positions you must be technically sound not only on IBM 360 or 370 hardware but on the associated software, utilities and JCL. Deputy shift leaders will organise the work of our other people on each shift whilst the senior operators will take responsibility for the work on their particular machines.

For the junior positions you must have at least one year's experience as an operator although not necessarily on IBM equipment as our client will carry out any conversion training required.

To apply for any of these positions please telephone or send your cv to



Castle Computer Services Limited

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(mini computers)

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- management of advertising budget
- production of trade shows
- press releases
- technical publications
- financial announcements

Additionally, he must be capable of "growing" a full P.R. Department and, ideally, should be fluent in a European tongue in addition to English. Some travel to the USA is an additional feature of this exciting appointment.

CONTACT: DALE HADLEY on: 021-236 3781

REF: CW/11/10

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Senior Systems Analyst — to £6250
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An excellent opportunity exists for an experienced Analyst/Programmer seeking additional responsibility and career progression within a challenging commercial environment. The successful candidate will probably be earning in excess of £4,000 per annum and is required to join a small department involved in developing a unique ON-LINE database order processing system.

Applicants should have at least 4-5 years' programming experience in both COBOL and ASSEMBLER and preferably already have worked on the analysis and design of a major commercial application. ON-LINE programming experience is essential and a knowledge of any database management system would be a distinct advantage. We are also looking for proven ability in staff supervision.

The company is located in the north-east of Derby within easy reach of the Derbyshire peaks and all air-transport facilities will be met.

Apply to the first instance to: Personnel Officer, William Halliwell & Co. Limited, Viyella House, Somercotes, Derbyshire.

VIYELLA

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OF SCIENCE AND TECHNOLOGY
CONTROL SYSTEMS CENTRE

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A vacancy exists for a part-time programmer, male or female, with 1-3 years experience of FORTRAN Programming, preferably in a time-sharing environment. The successful applicant will join a small group developing and maintaining application software for control systems studies.

The Control Systems Centre has access to a DEC SYSTEM 10 computer which is one of the major nodes of the Science Research Council's 'Interactive Computing Facility'. The system comprises a 100 processor, 128K of core store, 200 megabytes of on-line disc storage, magnetic tape drives and on-line graphics and teleprinter terminals.

The post is for 22½ hours per week to full week, 9.30-5.30 hours with hours by arrangement, and commencing salary according to age and experience will be £3.00 p.h. on the grade 18 scale £2504-£4811 per annum.

Apply in writing, enclosing a curriculum vitae, including current position and salary, quoting reference number SC/102/SC to the Personnel Officer, PO Box 88, Manchester, M20 1QD by 2nd December, 1977.

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- * a minimum of 3 years' sales experience in a computer related environment
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Our clients offer a wide range of services with excellent technical support. The terms and conditions of employment which apply to these positions are commensurate with a Company of the stature of UNILEVER.

S.C.R. is retained by Unilever to recruit for the above positions. All applicants should apply directly to S.C.R., who are conducting the initial interviews.

CONTACT: DAVID WADE on: 081-833 0676 REF: CW/11/20

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To assist with this major development programme they are now seeking additional analyst/programmers who can offer experience in some of the following:

- Small IBM equipment, System 3 or System 32 an advantage
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- Ability to analyse user requirements and lead projects.

Successful Candidates will:

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Please telephone or write in strict confidence for more specific information regarding these vacancies quoting reference AW-01.

Please telephone for a confidential discussion or write to:
30 Fleet Street, London EC4Y1AA
01-353 5865

Materials Analyst Bahrain

The Bahrain Petroleum Company Limited requires a Stores Materials Analyst for their Refinery in Bahrain. Candidates should possess training and experience in Systems and Methods, and have had industrial experience in Materials control and planning, preferably in the oil refining or petrochemicals industries. This should include experience in computerised stock control systems and allied accounting functions, especially related to stock holding costs and ordering frequency. The successful candidate will be expected to contribute immediately to a review of existing systems with a view to improvement in line with the Company's latest requirements. Membership of Institute of Purchasing and Supply would be an advantage and candidate should be not less than 30 years old to have the requisite experience for this position.

The initial tour will be for one year, Mortarist or Bachelor Status, mutually renewable with free basic furnished Accommodation.

A salary of not less than £619 per month will be paid, commensurate with experience and qualifications, plus a generous Overseas Allowance and end of contract Bonus. THESE ARE PRESENTLY TAX FREE IN BAHRAIN. Paid home leave, with fares and incidental paid. Other benefits include education assistance extended to children of eligible age.

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Caltex (UK) Limited,
30 Old Burlington Street,
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Quoting Ref: MAB/CW



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The Arabian American Oil Company (ARAMCO) in Saudi Arabia seeks:—

Programmer / Analysts (Commercial)

with at least 'A' level education and a minimum of 3 years' PL/1, 360/370 with JCL, and IMS programming experience supported by a further qualification or membership of B.C.S.

Ref: 8281/PA

Technical Systems Programmers

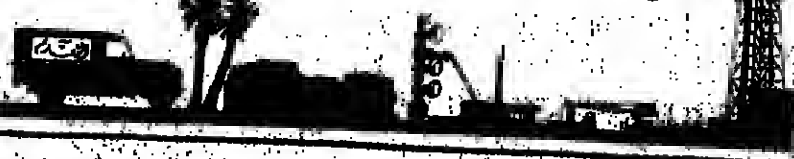
with 360/370 experience and knowledge of the internals of the OS/VS systems programme and also MVS internals, generation, debugging and maintenance. An engineering or computer science degree would be helpful.

The EDP operation centres on dual 370/158 and 370/188 under MVS and existing applications include materials control, maintenance scheduling, finance, payroll, tax and benefits plans. A large scale IMS/VS personnel data base is also being developed.

Appointments are single-status based on the Special Work Schedule; housing is air-conditioned and recreational facilities are excellent. A full, valid UK driving licence is essential.

Please send a brief description of qualifications and experience, quoting the appropriate reference, to Richard Dorrell, Astral Recruitment Associates, Astral House, 17-19 Moddax Street, London, W1R 0EY.

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for Staff User Education and Liaison

The successful candidate will be responsible to the Application Manager for the provision of short courses and seminars to assist Polytechnic staff in developing their use of the central computer service. The successful candidate will also be required to help our staff to encourage and assist them in the production of program materials to be used in teaching.

The service is based on an IBM 370/138 computer which provides batch and timesharing services to the Polytechnic, local colleges and schools.

Applicants should have sound practical computing experience and demonstrate an understanding of computing as it relates to a wide range of disciplines.

The successful candidate will be appointed at an appropriate point on the Senior Lecturer or Lecturer II scale depending on experience.

Salary Scale: Senior Lecturer (8623-8647) — £8006, Lecturer II (8344-8365)

Requests for an application form, in writing only please, to the Personnel Officer, Sheffield City Polytechnic, Hallards House, Fizekin Square, Sheffield, S1 2BB, to whom completed forms should be returned by December 2, 1977. Please quote ref. CVV.

LONDON SCHOOL OF ECONOMICS

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A systems programmer is required to participate in the development of an advanced multiaccess timesharing system. The computer is a Modcomp IV, a powerful 32-bit machine with a number of unusual hardware features.

The successful applicant will be involved as part of a small team, in many aspects of operating system design and implementation, offering considerable scope for creative work. Applicants should be educated to degree level and have at least two years' proven practical experience in assembly language or operating systems programming or a combination of the two.

Experience in telecommunication systems would be of particular value.

Salary, including London Allowance, is in the range £3,377-£3,848 (full-time) but may be £5,281 (part-time) depending on experience and qualifications.

Application forms from The Assistant Personnel Officer (209), London School of Economics, Houghton Street, London WC2A 2AE, (Tel. 01-405 7888, Ext. 522) should be sent to the Assistant Personnel Officer (209) by December 2, 1977.

HERTFORDSHIRE PROJECT LEADER OPPORTUNITIES BRITISH MINI COMPUTER MANUFACTURER circa £6,000

For Senior Programmers with the ability to manage small Design Teams, this represents an exceptional opportunity for career progression.

Our Client's highly successful range of computer systems have earned them increasing acceptance in both the technical and commercial markets. Volume of sales has created requirements for additional software expertise in the following areas:

PRODUCT SOFTWARE DEVELOPMENT

Product developments include:

- * operating systems software and languages
- * telecommunications and transaction processing software, including the use of micro-processors

Your responsibilities would require, in any of the above areas:

- * the creative flair in software understanding and development

Both of the above positions offer early management opportunities of larger teams as the Company continues its market penetration.

CONTACT: DAVE SCARLETT on: 01-935 0671

SPECIAL CUSTOMER APPLICATIONS

This Team provides tailored software solutions ranging from enhancements of software packages to major turn-key systems.

Skills demanded include:

- * the creative ability expected in a software development team
- * the personal skills to succeed in communicating with customers in pre- and post-sales situations
- * a sound hardware know-how

SPECIALIST COMPUTER RECRUITMENT LTD.

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Freeport, Equity and Law House, 35-37 Great Charles Street Queensway, Birmingham B3 2BR

MANCHESTER 061-833 0676 FREEPOST

Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST 6

Freeport 6, 102, Blandford Street, London W1E 1JZ



SOFTWARE DESIGN AND DEVELOPMENT

The use of mini-computers and microprocessors is spreading rapidly, generating exciting career opportunities for software people. One of the fastest growing application areas is in the real-time control of complex automated systems for various industrial processes.

Our client is a British company, long established internationally in the forefront of its chosen field. Their organisation embodies a Software Design Department, which undertakes the design and development of standard systems software, language facilities and compilers, as well as advanced application packages. These are used by application groups to build custom automation systems.

Increasing new product development and business expansion have generated interesting career vacancies.

Located in very congenial conditions in the Northern Home Counties, these vacancies represent an excellent opportunity for career development in one of the most exciting and fast developing sectors of computing today.

Terms of employment include an excellent Superannuation Scheme, 4 weeks' holiday, free life assurance, subsidised restaurant and sports/social facilities. Where applicable, relocation assistance is available.

TEAM LEADER - CORAL

£NEG

A Senior Software Designer, with 5/6 years' mini-midl experience mainly on compiler development (especially Coral, Fortran, Algol, Pascal, RTL2), is required to lead a team responsible for the continuing development of a CORAL compiler, including the design of major enhancements and the design and implementation of supporting software.

RW44/1

TEAM LEADER - Interactive Languages & Support £NEG

Responsible for the detailed design of interactive language systems, assemblers, linkers, etc., this Team Leader will probably have 4 years' experience on "systems" software, including interactive languages. He/she will currently be functioning as a team leader and will also have knowledge of compilers or real-time operating systems, or other relevant areas.

RW 44/2

These are primarily technical roles, but team leading ability is also essential.

SENIOR SOFTWARE DESIGNER - CORAL

Up to £7500 p.a.

Reporting to the Team Leader — CORAL, the Senior Software Designer will be responsible for detailed design and implementation of sections of the CORAL compiler.

Candidates will have some 3 years' relevant experience, of which some 50% should have been on minis.

RW 44/3

SOFTWARE DESIGNER

Up to £5500 p.a.

A man or woman with two or more years' experience is required to work in the real-time operating systems area, or perhaps detailed level compiler work.

The important qualifications for this job are application and the ability to display a creative flair to software development work. Knowledge of operating systems, or compilers would be advantageous, but evidence of creativity and mental capability is more important.

RW 44/4

SOFTWARE DESIGNERS - APPLICATIONS AND SYSTEMS SOFTWARE

Up to £5500 p.a.

Possibly graded as Senior Software Designers, these men/women will join a team with the responsibility to add new application packages and operating systems and language facilities to the company's established product range. Candidates should have 2-4 years' experience, ideally gained in a process control environment, either as a member of a custom application group, or as part of a design group. Knowledge of at least two of the following must be evident:

- Process Control
- Communications
- Real Time Operating Systems
- Language Processors
- Support Systems

RW 44/5

The above vacancies are all first-class opportunities to exercise your software skills to the full. You will be working with modern computers—Digital PDP/11 range—and utilising them in a state-of-the-art, real-time process control environment. The company's systems are in use throughout the world, controlling a wide variety of industrial processes, such as steelmaking and chemical plant, and the range of applications will undoubtedly be spread even further. The environment is thus interesting and stimulating and the work demanding and fulfilling.

The company places great store by its people, who constitute its principal asset. We would, therefore, be interested in hearing from individuals who have experience in the field and have a contribution to make, even though they need not exactly fit the above job descriptions. You are invited to telephone Tony Baker 01-499 4501 to discuss these opportunities.

hutchinson-scoggins recruitment
10 Dover Street, London W1X 3PH Telephone 01-499 4501

NEW OPERATIONS SECTION

The Anglian Water Authority is installing a dual Honeywell 66/10 384 K in its new purpose-built Computer Centre at Huntingdon.

A major programme of computer development including Data Base and Telecommunications has now started and this offers exciting opportunities for experienced staff to help set up and run a new Operations Section.

The following staff are required:-

- CHIEF OPERATOR (Ref: RP35)
Salary to £6,143
- ASSISTANT CHIEF OPERATOR (Ref: RP38)
Salary to £5,537
- NETWORK CONTROLLER (Ref: RP39)
Salary to £5,537
- ASSISTANT NETWORK CONTROLLER (Ref: RP44)
Salary to £5,000
- 2 SHIFT LEADERS (Ref: RP36)
Salary to £5,000+Shift Allowance
- 2 SENIOR OPERATORS (Ref: RP42)
Salary to £4,517+Shift Allowance
- 6 OPERATORS (Ref: RP37)
Salary to £3,673+Shift Allowance

2 Shift Working is expected to start in March 1978 for which the shift allowance will be up to 14%, depending upon shift timing.

Generous relocation expenses are payable in appropriate cases. Application forms (returnable by 5th December '77) are obtainable from the address below or by telephoning Huntingdon (0480) 56181 Ext. 252.

PERSONNEL DEPT, ANGLIAN WATER AUTHORITY,
DIPLOMA HOUSE, GRAMMAR SCHOOL WALK,
HUNTINGDON, CAMBS. PE18 6NZ

Small Business Computers Training Management/ Instructor Opportunities

SALES TRAINING MANAGER

Our client, a major international manufacturer launching a new small business computer, has a vacancy for a Sales Training Manager to design and develop sales training methods and conduct courses for Sales personnel, Analysts and Branch Managers. He/she will also investigate and co-ordinate training requirements internationally and follow through in the field in liaison with Branch Managers. The position calls for a dedicated person who views the training function as a key contribution to the achievement of sales budgets and profitable company growth. A background of successful selling and training in capital office equipment or small computers is required, and education to degree level would be an asset.

TECHNICAL SOFTWARE INSTRUCTOR

The Instructor will identify, develop and conduct training and educational courses which satisfy the product educational needs of both the company and customers. He or she will maintain a library of educational material and evaluate customer personnel for operator or programmer training. A working knowledge of PC/II and commercial software applications is required together with 2 years computer educational experience. Education to degree level would be an asset, and international travel will be involved. Salaries are excellent and benefits include car allowance, free life assurance, contributory pension scheme, optional BUPA membership and subsidised staff restaurant. So, either send me details of your career to date with current salary, or telephone for an application form. All replies will be treated in strict confidence and you may mention companies to which your reply should not be sent. Quote Ref CWV/200.

Brian Withers

GRS

Gerrard Recruitment Service
10 Argyll Street, London W1V 2BQ. Tel: 01-437 6816.

CUSTOMER SERVICE ENGINEERS

If you have a minimum of three years' maintenance experience on large scale Univac or IBM Computer configurations which include disc and magnetic tape sub-systems we would be most interested in discussing future career prospects with you.

Successful applicants, male or female, will be offered a minimum basic salary of £6,000 per annum. In addition, generous allowances for shift work, car and relocation will be paid where appropriate.

For an interview appointment:

Phone Watford (0923) 40704
or write to:

Mr. Jim Harvey
LINK DATA SYSTEMS LTD
26 The Parade
Watford, Herts. WD1 2AA

COMPUTER MAINTENANCE SERVICES

COBOL PROGRAMMERS

We are looking for experienced COBOL programmers to work on new program development. We are based at the Spadley's Head Office in Stratford-upon-Avon where we operate an ICL 1903A computer. The salary range is £4,000 to £6,000 p.a. depending on experience. Commencing salary will be dependent upon experience. Four years' good programming experience is essential. For an Application Form and further details, please write to: The Personnel Department, Spadley's Head Office, 100 Maryland Street, Stratford-upon-Avon CV37 9JF.

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Operate For A Company That Cares**And earn C. £4,300 in Croydon**

If you have experience on any mainframe hardware and consider yourself a bit above the rest then we would like to meet you. Our client will provide all training necessary to enable you to carry out duties efficiently and to allow you to progress personally.

The company operates large mainframe equipment linked to a network of terminals and the management services function is expanding on a variety of fronts. You will join a team working on a 3 shift system with opportunities for overtime.

If you have the ability to act as Senior Operator, your earnings will be C.£4,300 including shift allowance with a review after six months. Other benefits include free meals with every shift.

There are wide ranging career paths within operations as well as opportunities to develop within other areas of management services. To find out more about this go-ahead installation which encourages personal progression, telephone our CROYDON office or write quoting reference: CW 65-7H.

01-888 9983 (24 HOUR ANSWERPHONE)
19 PARK STREET, CROYDON, CR9 1TN

081-238 2419 FAULKNER HOUSE
FAULKNER STREET, MANCHESTER, M1 4YD

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TWO OUT OF SIX?

If you can tick two (or more) of the boxes because you have relevant experience our client would want to talk to you. And, equally important, you would want to talk to him.

His need is for real-time systems & software engineers who are interested in working on advanced technology projects for the U.K. and export markets.

You would be interested in this field of work, are looking for a salary of between £3,500 to £5,500 p.a. now, want to join a company which can offer a variety of work and provide good working conditions in a particularly pleasant area. Further, you would like to talk to someone who won't keep you hanging about for weeks.

For a brief chat now please ring John Nolan at Richard Owen Advertising on 01-638 1891

Richard Owen Advertising
Cross Keys House, 56 Moorgate, London EC2R 6EL

Group Leader Software**c. £6,000**

Plessey Radar Research Centre at Southleigh Park House, Havant, has developed a computer based image processing system, giving a new dimension to information available to scientists concerned with environmental problems. The Remote Sensing and Image Analysis Unit is responsible for equipment development, consultancy, feasibility studies and, in part, for technical investigation both in the UK and abroad.

The Group Leader will be responsible for the software team and must have experience of the design of scientific software systems of an interactive nature. In particular experience of interfacing special purpose fast digital hardware could be an advantage.

Southleigh Park House is located in an attractive rural area of Hampshire close to the amenities of the South Coast, between the cities of Portsmouth and Chichester.

Please contact John East, PER, 62-64 High Street, Southampton, (0703) 39856.

PROFESSIONAL and EXECUTIVE RECRUITMENT

PLESSEY**Computer Control Systems**

We are the Digital Systems Division of a large industrial corporation with business interests in all five continents. We are at present expanding our development capabilities in Walsby Garden City to engineer a new range of equipment for automation and process control applications.

Vacancies exist for electronics design engineers and computer programmers to work on mini computer and microprocessor based projects.

Computer Programmers

One of the appointments will be at a senior level and will require both technical and leadership skills. The position will be offered to a programmer of graduate standard with several years experience including assembler language preferably in a real time environment. Sound Fortran experience is also desirable.

Salary to £6,000 p.a.

For the other positions we are prepared to consider candidates of graduate standard and with relevant experience, but at an earlier stage in their career.

Salary to £5,000 p.a.

Development Engineers

Candidates should be of degree or HNC standard with experience of digital and analog techniques. Preference will be given to applicants with experience of microprocessors or process interface equipment practice. However, suitable applicants at an early stage in their careers will be given full consideration.

Salary to £6,000 p.a.

We offer a contributory pension scheme and generous assistance with relocation expenses will be given if necessary.

Please write to Box 1906 Computer Weekly for application form and give brief outline of career to date.

Computer Research and Development Officer

Asda, part of the Associated Dairies Group has changed the face of retailing in the last decade. The rapid development of our retailing techniques has contributed to a turnover in excess of several hundred million pounds, and we now have 59 stores successfully operating nationwide.

Due to the continued increase in the use of computers in the control of our retail branches, it is necessary to strengthen our existing team working in our Research and Development Department at Morley, near Leeds. The successful applicant will be expected to liaise with our Group Computer Department, responsible for the design and implementation of future computer systems.

Outlets will include research and specification of computer systems within the framework of the Company's computer development plan, involvement with systems testing, implementation planning

and staff training. There will also be involvement with various other projects which require the application of computer techniques.

Candidates, male or female, will need to have some practical experience of computers, programming, system specification and the application of such systems to retail distribution.

Qualifications will include a formal training with emphasis on O & M of systems control and be qualified to H.N.C. level in business studies or similar. It is also of prime importance that you have the ability to communicate at all levels of management.

The salary, which is negotiable around £4,000, will reflect the importance of this position and assistance with relocation expenses will be given, if necessary.

Please write for an application form to:

Mr. M. R. W. Clark,
Personnel Controller,
Asda Stores Limited,
Asda House, Brimley Road,
Morley, N. Leeds,
Yorkshire LS27 8BT

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IBM ASSEMBLER PROGRAMMER**NORTH WEST LONDON****to £6,000**

Our client is a privately owned company, responsible for the data processing function of approximately 2,000 users. They have 5 branches in and around London and 1 in Europe and we are currently recruiting for the Wembley office where their IBM hardware is located.

The successful applicant will be a member of a small team and opportunities for movement into analysis could arise. This is an excellent opportunity to get involved with development work as extensive systems redesign is planned.

You must have 2 years IBM Assembler experience, be educated to 'A' level standard and have the ability to cope with career advancement in a commercial environment.

Ref CB 4142

Computer People

FORTRAN**to £5,000 (+ London allowance) 498****PROGRAMMER****CENTRAL LONDON**

An interesting and challenging job exists within a London based systems group of this leading multi-national company.

The successful applicant will have a sound knowledge of Fortran programming used in a problem solving environment, and some Technical/Mathematical experience would be advantageous. He/she will be able to use initiative and be motivated to contribute in this important systems area.

The successful applicant will have had at least 1½ years relevant experience and will be encouraged to develop towards a team leading role or to progress into the broader applications areas of computer systems.

A high starting salary, four weeks holiday, first class working conditions including restaurant, sports and leisure facilities are offered with this excellent opportunity.

Generous relocation assistance is available — telephone or write to arrange an interview in London, Birmingham or Manchester.

Computer People

Ref. SC/14

SYSTEMS ANALYST**c £6,000 + benefits****SWINDON WILTS**

The UK subsidiary of an International Group require a Systems Analyst for their Manufacturing Branch which is one of the most up-to-date in Europe.

Applicants should have sound applications experience, preferably from a manufacturing environment although training will be given.

A strong technical background is desired together with a good programming knowledge plus the added advantage of being able to communicate effectively with all levels of user staff.

A 370/136 is based in London and will be upgraded in February to a 370/125 model 2

A 3270 network will be installed in Swindon operating through the CICS monitor.

Working conditions and fringe benefits are excellent together with a superb career path.

Ref SR 5000

Computer People

ESSEX**to £6,000**

Are you Bored with your work?
Are you Tired of travelling?
Are you Frustrated with lack of responsibility?

If you are 'suffering' and have sound Cobol knowledge in either a commercial or financial environment the development projects of this U.K. organisation can provide the solution.

Ref AH 1717

Computer People

ICL/HONEYWELL OPERATIONS**£2,800 - £4,500**

At present the job market is offering TREMENDOUS SCOPE for ICL and HONEYWELL operations personnel. Probably the best opportunities are for those of you with between 6 and 12 months' experience with one user and are now interested in a job move for any of the following reasons:

- to gain experience in a different installation
- increase your salary
- change shift system
- work closer to home

Why not phone us to see if your current circumstances could be improved — we would be pleased to hear from you.

Ref KS GEN.

Computer People

Computer People
A member of the Vanson Landfield Investments group

KINGSTON SURREY**£6,000****ICL PLAN PROGRAMMER**

Applicants living in South London, Surrey and Middlesex will find our client easily accessible by road and rail. In addition you will have all the advantages of working within reach of sophisticated amenities without the disadvantages of commuting into London.

Working in a bureau environment on an ICL 1901T, you will be involved in the development of new packages for a large number of clients. It is considered unlikely that applicants with less than 2 years experience of ICL 1900 PLAN would be capable of taking up the responsibilities which our client offers. However, if you are self motivated, intelligent and commercially orientated ring now to discuss this position.

Ref CB 4141

Computer People

APPLICATIONS CONSULTANT (LONDON)**c. £5,000****PLUS CAR ALLOWANCE PLUS BONUS c. £1,000+**

A total package in the region of £8,500 is available to candidates wishing to become Applications Consultants with a major computer services company.

After training, responsibilities will involve identifying and consulting on commercial applications with on going technical support in a number of high-level timesharing products with end-users, typically at senior management level.

A background including several commercial systems, preferably involving database management is required and degree level qualifications in computing or business studies is essential.

Experience in a sales environment would be an advantage.

The company can offer excellent career opportunities in its continuing expansion.

Successful candidates are likely to be between 26 and 36 with no more than two job moves in the last four years.

Ref CB 10000

Computer People

TOMORROW'S COMMUNICATIONS SYSTEMS TODAY!**SENIOR PROGRAMMER London Based up to £6,000**

International Data Controls with local real-time terminal networks send the World's media men into action. POP/11 Experience in the communications field with strong project leading potential will be of interest to our client. Knowledge of RSX 11M and RTL2 an asset.

Whilst maintaining existing systems will be an important part of the work, successful candidates will be involved in major development projects such as automatic message switching and distribution of textual news.

Could you be helping to create systems that will be tomorrow's standards?

Ref RS B203

Computer People

PROGRAMMING CONSULTANTS**LONDON****to £6,500**

An established and respected name in the consultancy field is currently recruiting for its expanding project teams. Projects usually have an emphasis on on-line or database systems, hence the opportunity to extend and advance your career.

Professional standards demand exceptional applicants, ideally with COBOL, FORTRAN or PL/1 programming experience although training will be given.

Prospects are excellent with openings into analysis and project management as a natural progression. Candidates could, on occasion, be given the opportunity to undertake foreign travel.

Ref CB 7000

Computer People

OPERATOR DOS/VS POWER**up to £4,000****C. London**

Candidates must have a minimum of 12 months 370 DOS/VS experience and salaries are dependent on this. Ref NA 8191

PRODUCTION CO-ORDINATOR**circa £4,000**

A large International Company situated in Central London requires a production-control officer/co-ordinator. Applicants should have a sound knowledge of IBM data-control procedures coupled with related Job Control Language, operational experience would also be an asset.

The successful candidate will work on a two shift basis at a relatively senior level. Promotional prospects are in-line with most large companies.

Ref NA 8186

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NEW BIRMINGHAM SALES OPPORTUNITIES**Eurocom Data Limited**

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(To market COM in the Midlands)

Realistic on Quota earnings

CIRCA £7000 + CAR

(Basic £4000-£5000 + Commission)

Eurocom Data Ltd. is a fast growing international Computer Output on Microfilm Bureau providing services through 5 centres in the U.K. and 8 further centres in Europe via Eurocom Data (Holdings) Limited.

Suitable candidates are likely to be successful VRC or Bureau Salesmen who have a good working knowledge of Computer and Business systems, and have consistently achieved Quota. However, we would be pleased to train experienced systems programming persons interested in moving to a sales environment.

Applications to:-

The Personnel Manager
Eurocom Data Limited
3 High Street, Rickmansworth, Herts.
Tel. No.: Rickmansworth 74112

GATESHEAD METROPOLITAN BOROUGH COUNCIL

DEPARTMENT OF FINANCE**SERVICE AUDITOR (COMPUTER)**

Salary £4889-£5250 plus supplementa.

A vacancy has arisen within the Internal Audit Section for a Service Auditor (Computer) due to the post holder successfully obtaining a senior position with a Water Authority.

Responsibilities of the post will involve audit of the Authorities Computer Installation and Associated Systems. An ICL 1903T system, presently installed using the George III operating system, and extensive use is made of communications equipment.

The Director of Finance, who is also the Deputy Chief Executive of Gateshead Metropolitan Borough Council, leads a young, vigorous unit which welcomes newcomers with new ideas.

Applicants should possess a suitable accounting qualification and must have Computer Auditing experience.

For further information contact Mr. K. Robson. Tel. 0832-771204, Ext. 25.

The post is supernumerary and subject to satisfactory medical clearance.

Salary and Conditions of Service are in accordance with the N.J.C. Agreement for APT and C Services.

Application forms are available from the Director of Personnel and Management Services, 7th Floor, Aldon House, Tyngate Precinct, Sunderland Road, Gateshead, Tyne and Wear NE8 3BL, and returnable by 2nd December.

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**Project Leaders/
Analysts and Progs.
North West To £6500**

**IMS, PL/1 ENGINEERING AND
MANUFACTURING SYSTEMS**

EMS currently have letge requirements for experienced IBM IMS and PL1 staff in the N.W. Region to join either our own established consulting group on secondment to the clients or to be recruited to work for the client organisation directly. Applications projects will include goods receiving, process planning, stores control, etc. Analysts with a knowledge of OBOMP would be especially useful. For initial discussions, complete the attached application form and forward it to EMS without delay.

Consultant, John Wood.

IBM Programmers

Overby To £4500

Our clients require a number of additional Programmers and Programmers Analysts to work in small project teams split, each team 50% development, 50% maintenance. Projects generally are commercial batch work, Payroll, Accounts, Sales, Stores, etc. Language experience should be ASSEMBLER, COBOL or PL/1. Some on-line development is envisaged within the next 2 years. Consultant: Salina Mills.

Analysts and Progs.
London £3500 to £6500

EMS are currently and constantly inundated with thousands of vacancies for experienced DP staff to work in the London or Home Counties area. All ranges of hardware are included. Wide choice of commercial or industrial installation exists at present, we are placing virtually every analyst or programmer who applies to us for vacancies within this region in only a few days. We offer you a vast choice of vacancies, a salary advice if required and early results. Apply to us today and you will have your first trial or potential interview telephoned the next day. The following week for you to decide which you prefer. Consultant: Selma Mills.

**ICL Analysts and
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Hundreds U.K.
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Venicians exist in every major town and city throughout the U.K. for experienced ICL OP staff. Clients include banks, bureaux, chemical manufacturing, distributors, engineers and manufacturing. We currently have hundreds of positions outstanding just waiting for you personally to complete our application form to enable us to rapidly provide you with a wide range of attractive opportunities. We could place a third of the entire industry in new positions if sufficient profiles were completed. Let EMS get results for you

Consultant: Don Wellgate / Satine Mills.

Leading Vacancies Middlesex To £6500

Project Leaders, Senior Analysts, Analysts, Program Designers, Chief Programmers and Programmers.

Opportunities exist with a large group, substantially increasing their investment in modern, sophisticated hardware, for a wide range of experienced O/S staff. Experience in the following areas is urgently required: Production Control, On-line/Real time Systems, Database development, general commercial Accounting and Sales Order Processing, down to COBOL programming. Opportunities will be missed in the Midlands area.

Consultant: Selina Mills/Carol Proudman.

IBM Analyst Manchester To £4800

Good commercial experience in an IBM environment is sought. Ideally applicants should have worked at least 2 years in a similar position. The group have an international clientele and supply engineering products to a large consumer market.
Consultant: Don Watkins

Marketing Support Consultants
To £6000 +

Candidates educated to minimum HNC level and required by the EMS group to assist with the marketing of Honeywell Level G Mini Computer Systems, ICL 2900 Series time-sharing and general package development/sales. Ability to function as a junior business analyst will be important to rapidly identify and propose relevant solutions to client problems. Equally duties will include assisting with the recruitment of resources division support staff to cope with the rapid development of the EMS Group. Ability to present reports and recommendations at a director level will assist all applicants. For further job specification contact: John Wood.

ICL 1900 COBOL Programmers West Country To £5000

A small Gloucestershire bureau has vacancies for additional Programmers to assist with developing client accounts. Candidates will be given appropriate applications training where necessary. Opportunities exist for both Junior and Senior staff working in a very popular location with good middle term career prospects.

Consultant: John Wood.

**Systems Programmers,
Systems Designers,
Systems Engineers**
London To £5300

A large banking group have numerous vacancies for staff experienced in DOS/VS, ASSEMBLER or COBOL and possibly CICS. A minimum 2 years' IBM 370 experience is essential. Equally relevant staff with experience of financial system or banking conditions are available at a convenient City location. Consultant: Selma Mills.

**Systems Analysts
West Midlands**

Performers will be for candidates oriented to assist HND Invid. The main activities of system development include investigation of enemy systems and assessment of future requirements. Preparation of initial reports and agreements with users. Preparation of individual program specifications, including test data. Systems tests and Parallel/Plot running and completion of use schedules which must be adhered to.

Consultant John Wood

**IBM 370 PL/1
Analysts/
Programmers
Lancashire To £7000**

Any experience of IMS would be gratefully welcomed. We have urgent, large scale requirements for a leading industrial group to embark upon a major systems development exercise. Experience of working in a manufacturing industry would be advantageous. Staff will be expected to work in large project teams, involving tight schedules and controls. Opportunities also exist for travelling throughout the U.K. or other group sites overseas during later 1976. Attractive salaries will be paid in a wide range of applications and software support staff with 2 years' and more practical experience. Consultant: Niall Bradley.



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Figure 13. To solve the eight-queens puzzle, the solver generates a sequence of hypotheses, starting with $Q_1 = 1$, and then successively adding hypotheses, employing a strategy of $Q_i \neq Q_j$ to eliminate those partial hypotheses in which Q_i and Q_j conflict.

For Office Use only

Company Ref. No.

SURNAME											
Other Names											
Address						Telephone					
						Home					
						Bus					
Post Code						Ext					
Age		Date of Birth		Place of Birth		Nationality		Height		Weight	
Married		Children		Car Owner		Driver		Nature of any Serious Illness			
Position Required						Required Salary Range					
Present Position						Salary					
WHERE DO YOU WISH TO WORK											
Within U.K. Will you move		Yes/No Yes/No		Acceptable Areas				Abroad Europe Middle East		Yes/No Yes/No Yes/No	
NUMBER OF YEARS EXPERIENCE											
Operating		Programming		Systems Design		Systems Analysis		Management		Total	
Available for Interviews											
Available for Employment											
DETAILS OF SECONDARY AND FURTHER EDUCATION											
Schools				Date		Examinations Passed					
College/University				Date		Examinations Passed					
Business Courses with Dates											
1. Present Employer						Town					
Position						Date Joined					
TYPE OF INSTALLATION											
Commercial Manufacturing		Bureau Banking		Insurance Education		Scientific Engineering					
HARDWARE			OPERATING SYSTEM			LANGUAGES					
Software or Packages											
On-Line R.J.E.		Real Time Tele Processing		Time Sharing Data Base							
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN (Please Tick)											
Cost Accounting		General Ledger		Manpower Planning		Personnel					
Budgeting		Credit Control		Stock Control		Payroll					
Forecasting		Order Processing		Production Control		O.R.					
Corporate Planning		Marketing		Petrochemicals		Radar					
Sales Ledger		Distribution		Linear Programming		Statistics					
Purchase Ledger		Traffic Analysis		Simulation							
Projects Completed				Responsibilities							
2. Previous Employer						Town					
Position						Date Joined					
TYPE OF INSTALLATION											
Commercial Manufacturing		Bureau Banking		Insurance Education		Scientific Engineering					
HARDWARE			OPERATING SYSTEM			LANGUAGES					
Software or Packages											
On Line R.J.E.		Real Time Tele Processing		Time Sharing Data Base							
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN											
Cost Accounting		General Ledger		Manpower Planning		Personnel					
Budgeting		Credit Control		Stock Control		Payroll					
Forecasting		Order Processing		Production Control		O.R.					
Corporate Planning		Marketing		Petrochemicals		Radar					
Sales Ledger		Distribution		Linear Programming		Statistics					
Purchase Ledger		Traffic Analysis		Simulation							
Projects Completed				Responsibilities							

Reason for Seeking Change											
Details of type of position wanted											
Additional Information -- Please explain below, in an 8-10 line precis, your current duties and applications experience.											
FOREIGN LANGUAGES											
Spoken				Written				Read			
Please show the number of years experience of the following. Where your experience is not specified please use the blank spaces.											
HARDWARE		OPERATING SYSTEM		LANGUAGES		PACKAGES/SOFTWARE					
IBM 380/370		OOS		COBOL		FILETAB					
ICL 1900		OS		FORTRAN		ORIVER					
ICL 2960/2970		MVT/MFT		ASSEMBLER		CICS					
ICL 2903		GEORGE 1		PLAN		IMS					
UNIVAC 1100		GEORGE 2		PL1		BOMP					
UNIVA C other		GEORGE3		RPG2		O BOMP					
BURROUGH 700/800		MCP		USERCOOE		PET					
BURROUGHS other		Evac 8		AUTOCODE		V SAM					
HONEYWELL 66		GDS		EASYCODER		IDS/TDS					
HONEYWELL 8000		OS 2000/200		ALGOL		MICROFILMING					
HONEYWELL other		VMEB/VMEK		NEAT		TELEPROCESSING					
NCR		J Level		CORAL		OMS					
ICL System 4				OLI							
PDP											
3 Past Employer Position								Town Date Joined			
TYPE OF INSTALLATION											
Commercial Manufacturing		Bureau Banking		Insurance Education		Scientific Engineering					
HARDWARE		OPERATING SYSTEM		LANGUAGES							
Software or Packages											
On-Line R.J.E.		Real Time Tele Processing		Time Sharing Data Base							
APPLICATION AREAS YOU HAVE BEEN INVOLVED IN											
Cost Accounting		General Ledger		Manpower Planning		Personnel					
Budgeting		Credit Control		Stock Control		Payroll					
Forecasting		Order Processing		Production Control		O.R.					
Corporate Planning		Marketing		Petrochemical		Radar					
Sales Ledger		Distribution		Linear Programming		Statistics					
Purchase Ledger		Traffic Analysis		Simulation							
Projects Completed				Responsibilities							
PLEASE CHECK THAT EACH SECTION HAS BEEN TICKED APPROPRIATELY:											
ADDITIONAL INFORMATION											
General											
Data Processing											
Terminals											
Software/Packages											
Application Areas											
Projects and Responsibilities											

Design....



with computers

In order to achieve the new Model Design and Development Programme for Leyland Cars, there is to be a significant expansion of the Technical Computing Department. We offer an exciting opportunity to help us meet the challenge over the next decade, working in the areas of Computer Aided Design, Surface Design, Structural Analysis, Simulation of Dynamic Problems, Test Data Recording and Analysis, and Systems Programming. Applicants are likely to be aged 23-30, should be educated to O-level or HNC level in engineering, mathematics, science or computer science. FORTRAN programming experience is desirable, but not essential, as training would be considered for the right applicants. Excellent salaries are offered and attractive fringe benefits, including a Car Purchase Scheme; 26 days holiday after one year plus 7 days statutory holiday; attractive discount on new cars after 6 months service and subsidised canteen meals. We also will pay relocation assistance where appropriate. Interested men and women should apply in writing to:-



Leyland Cars

Mr. M. D. Ray, Recruitment Co-Ordinator,
Product Engineering Division, Leyland Cars,
Solihull Plant, Lode Lane, West Midlands, B92 8NW.

DATA PROCESSING MANAGER

Wigan

c. £4,500

Foster Ltd Limited the furniture manufacturers are seeking a Data Processing Manager to take charge of their newly installed Philips 410 disc based system.

Packaged software is available for the sales, purchase and payroll applications but applicants, aged at least 28 years should have sufficient experience of COBOL and systems analysis in decision programmes for sales analysis and production control. Training on this new installation will be given at Philips.

There are good prospects for promotion within the group.

Contact: Mrs. Liz Davis, PER Warrington, Warrington B21 6SS.

PER PROFESSIONAL and EXECUTIVE RECRUITMENT
This vacancy is open to male and female candidates.

SALES EXECUTIVES

£8K-£10K REALISTICALLY + CAR
LONDON, MANCHESTER, SCOTLAND, HOME COUNTIES

Decoll require experienced sales professionals to cover prime territories selling either mini-computer systems or terminals. Both ranges are highly competitive and offer good sales executives the opportunity to realise their earning potential.

For further details phone or write:

808 MURRAY, UK SALES MANAGER

on 0608 66666 DURING OFFICE HOURS

or 050 684 2780 EVENINGS OR WEEKEND

FIELD SERVICE ENGINEERS

£3.5K to £5K + CAR + PROFIT SHARING
LONDON, MIDLANDS, ABERDEEN, MANCHESTER, HOME COUNTIES

To maintain our mini-computer and terminals, which are selling well, we require experienced customer service engineers in the above areas.

For further details phone or write:

BRIAN COLLING, MANAGING DIRECTOR

on 0508 66666

DACOLL ENGINEERING SERVICES LTD.
Decoll House, Gardens Lane, Bathgate
West Lothian

Decoll

Unique Opportunities in Image Processing

Plessey Radar Research Centre at Southleigh Park House, Basing, has developed a computer based image processing system, giving a new dimension to information available to scientists concerned with environmental problems, including inadequate world food production, increasing pollution and the limitations of the earth's natural resources. Remote sensing by satellite and aircraft surveys using this system is a rapidly growing discipline and opportunities now exist for Electronic Engineers and Computer Scientists at various levels of responsibility. The areas include digital image processing, man-machine interfaces and high speed computers techniques. Additionally, Analyst/Programmers for the Software Team, with experience of designing and programming scientific software systems of an interactive nature, are required. In particular, experience of interfacing fast digital hardware could be an advantage. Salaries will be negotiated. Principal Engineers/Analysts c. £5,000; Engineers/Analysts c. £4,000. Southleigh Park House is located in an attractive rural area near Basing, Hampshire, close to the amenities of the South Coast. Please contact John Beet, PER, 82-84 High Street, Southampton, (0703) 39955.

PER PROFESSIONAL and EXECUTIVE RECRUITMENT

PLESSEY

Systems Analysts

London/Home Counties to £6,000+
Midlands/North of England

Our client, a major international manufacturer launching a new small business computer, has vacancies in London, the Southern Home Counties, the Midlands, and North of England. This is a ground floor opportunity for those men and women who wish to grow with one of the most prestigious names around. In particular, there are vacancies for:

Senior Systems Analysts to £6,000
Systems Analysts to £5,500
Document Writers to £4,500

The benefits package, which includes a car allowance, is excellent and the promotion prospects are real. So either send me details of your career to date, or telephone for an application form. All replies will be treated in strict confidence and you may mention companies to which your reply should be sent. Quota ref CW/202.

Brian Withers

GRS

General Recruitment Service
10, Argyll Street, London W1V 2BQ. Tel: 01-437 6816.

Scientific Programmers

Rolle-Royce & Associates Limited is engaged in an extensive programme of design, development and procurement of nuclear propulsion plant for the Royal Navy's submarines. We are looking for programmers to work on the development of systems of scientific programs using both UNIVAC 1108 digital and analogue/hybrid (SIGMA5/EA17800) computers. There are also opportunities to work on other computers including:

IBM 370
MODCOMP II
DEC PDP11
GEC 60/2
IMLAC PDS4

The most commonly used language is FORTRAN, but assembly language is used for

many of the small machine applications. Applicants, male or female, should have at least one year's experience using a high level language and knowledge of an assembly language would be an advantage. A degree in an appropriate discipline is preferred, but not essential. A generous allowance towards relocation costs is available. Please apply in writing or by telephone for an application form to:

RR & A

The Personnel Manager
Rolle-Royce & Associates
Limited
PO Box 51
Derby
DE2 8BA
or telephone Derby extension 3213

SERVICES COMBYTE LIMITED

LONDON BASED 12 PL1 PROGRAMMERS

If you have the desire to get away from the normal routine and are quite happy to spend periods in different locations throughout the U.K. and perhaps abroad then our Consultant Client would like to talk to you. As a Specialist with an excellent reputation in their field, they require better than average PL1 Programmers to undertake assignments for various Clients. Main qualifications are adaptability, mobility, capability and a liking for problem solving. SALARY reflects the type of people they are looking for and should not be a problem and will probably represent a substantial increase on your current earnings.

MID ESSEX PROGRAMMERS

If you have 2-3 years' COBOL on any MAINFRAME and are seeking a position in the Mid Essex area, we would like to hear from you. Our client is a small Manufacturing Company using a small ICL machine for a variety of Commercial Applications. SALARY is negotiable according to experience.

LONDON BANKING SPECIALIST

We have an urgent requirement from a major Banking Concern for a Senior Analyst/Programmer with extensive Banking experience. We need someone with 5 years' on either IBM or ICL machines and in-depth experience of COBOL and Systems work in Financial Applications.

In addition to a basic salary of around £5,500 p.a. the job carries a 3% mortgage plus a car plus other benefits.

LONDON ANALYST/PROGRAMMER

A City Financial Organisation has a requirement for a Programmer or Analyst Programmer to work on both REAL-TIME and Batch Systems within a small department. The current MAINFRAME is being upgraded and a mini installed in addition. You will need 4 years' use of COBOL and/or ASSEMBLER and some Systems Design ideally. The job offers an opportunity to become more involved in Systems work and carries a salary of up to £4,800 p.a. plus mortgage facilities.

SURREY RPG II PROGRAMMERS

A specialist highly successful consultancy have need for Programmers and Analyst. Programmers with at least two years' experience on IBM SYSTEM 3, SYSTEM 32 ICL 2903 or other small systems using RPG II. They are able to offer a high degree of job interest plus excellent career opportunities. SALARY is up to £6,000 p.a. PLUS a company car after an initial period.

SUFFOLK ANALYST

Located in a major East Anglian Town close to the coast and pleasant country since our client is a manufacturing company currently in the process of expanding its Data Processing activities.

They require an Analyst with 3 years' in the Design and implementation of commercial systems to act as an Internal Consultant between group users. Hardware and Programming background is not as important as the ability to communicate and participate in a varied range of projects, preference is for a younger person possibly educated to degree level but this is by no means compulsory. SALARY will be attractive and will be combined with opportunities available in a rapidly developing section of the company.

REMEMBER

The above represents only a small selection of our requirements. If you are currently considering a change of employment then it might be wise to talk to us first regarding a range of vacancies throughout the U.K.

CONTACT

IAN BACON/NEIL PHILLIPS
COMBYTE SERVICES LTD.
Suite 74/76, 12/13 Henrietta Street, London WC2E 8LA
Phone: 01-240 3223/4

WEST LONDON SENIOR PROGRAMMER/ANALYST

We have been asked to find someone with a fair amount of RPG II and System 3 experience to act as Deputy D.P.M. and effectively run the department for a large amount of the time. In addition to at least 2 years' RPG II you will need a year's Analyst experience plus some supervisory experience, most of the work will involve development of new systems as an Analyst for a small company in the Leisure Industry. SALARY is around £5,000 p.a.

SOUTHERN ENGLAND COBOL

WE HAVE A CONTINUAL REQUIREMENT FOR PROGRAMMERS WITH 1-5 YEARS' COBOL EXPERIENCE ON ANY MACHINE. VACANCIES EXIST WITH USERS FROM ALL AREAS OF INDUSTRY AT LEVELS FROM JUNIOR PROGRAMMERS TO TEAM LEADER.

IF YOU ARE A COBOL PROGRAMMER CONSIDERING A CHANGE THEN WE SHOULD BE ONLY TOO HAPPY TO ADVISE YOU ON SOME OF THE POSITIONS OPEN TO YOU.

LONDON SENIOR PROGRAMMER/ANALYST

Ideally a graduate with a technical degree. Must have 4 years' IBM COBOL with a knowledge of MARK IV being advantageous. The position will be of interest to those earning up to £5,500 p.a.

WEST ESSEX ANALYST/PROGRAMMERS

We would like to find a number of people for our Manufacturing Client currently in the process of installing new Honeywell Hardware.

FIRSTLY

We need programmers with 12 months' COBOL or any MAINFRAME. You will be thought a great deal about the sophisticated systems currently being run and those also being developed potential to advance into other areas is really excellent.

SECONDLY

We need an Analyst with sound design and implementation experience on Financial and Production Systems at a Senior level, experience of Project Leadership would be an asset. SALARIES for COBOL Programmers are in a range up to £5,000 p.a. and Analyst up to £6,000 p.a.

CONTRACTS

We are currently seeking personnel for a number of contracts, briefly detailed below. If you are currently available or expect to be in the near future we would like to hear from you:

PLI OS/DOS	Essex
BASIC PLUS	Essex
PDP CORAL	Berks.
RPG II	Various
Snr. CONSULTANT, PROCESS CONTROL COMMUNICATIONS	London
FORTRAN BACKGROUND	Munich
BASIC ANY MINI	(German Speaking)
IBM 3790 ASSEMBLER	London
Analyst-UNIPAY EXP.	London
15 PLAN/ASSEMBLER programmers, Long contract.	Scotland
George 2/3 operators	North and South

Mini Programmers

Mainframe Salesman

It could pay you
to pay us a visit

The next in the successful series of Square One get-togethers will be in our home town of Chesham. Come and talk to us over a beer and a sandwich, and discuss worthwhile opportunities in a company where skills and hard work really count.

Come at lunchtime or in the evening, whichever suits you best.

Mini Programmers: our immediate requirements are for experience in Fortran, Cobol or Basic. **Mainframe Salesman:** we need someone to cover London or the Home Counties. But we would like to meet computer professionals of all kinds.

We can promise you an informal but informative visit, and one which could change your life. Don't miss it. (Listen out for us on Capital Radio this weekend.)

**One
Open Day**

Monday November 21st 12 noon - 2pm or 5pm - 8pm
at The Limes, 130 High Street, Chesham, Bucks

*If you can't make it this time, we shall be holding another London Open evening at 150 Regent Street on December 5th.

Square One Computer Services Ltd 02405 74161

ALTERGO
COMPUTERS

We are searching for some talented imaginative and enterprising bodies in three specialist areas. You will be based in the Soho area of London and we need you to start at the earliest possible moment.

So far as salary is concerned we are prepared to offer the best if you can prove you've really got what we want.

SYSTEMS PROGRAMMERS

We want three Systems Programmers to support the DEC PDP-11 operating systems RSX11M and RSTS. Each person will have total control over an operating system with carte blanche within their arranged area. A real chance to get away from re-inventing the wheel. A knowledge of RT11 would be an added advantage.

SOFTWARE DEVELOPMENT

A Systems Programmer to take full control of software development on an INTEL-8080 based micro. Once again, carte blanche is offered to a person who can demonstrate the necessary enterprise.

MACRO PROGRAMMERS

We are looking for six imaginative MACRO-11 programmers for entertaining projects work in all shapes and sizes. The only common factor being, as ever, we'd like it by yesterday.

altergo

Contact: Robert Stash
Altergo Computers
Limited
8 Dean Street
London, W1
Telephone: 01-734 5511

Senior Programmer

If you are an experienced programmer, and are ready to add supervisory experience to your career development, then you could be the person that we are looking for.

The team is at present engaged in developing a new pharmaceutical costing and production system using COBOL and I.B.M. equipment. Within our progressive computer department you would be working directly under the Project Leader at Buxton, with responsibility for the supervision and technical development of a group of programmers of varying experience.

This significant appointment requires a person with wide programming experience and the ambition to develop supervisory management skills.

The position offers a salary to match the responsibility and a range of benefits including a contributory pension scheme, profit sharing scheme, staff discount facilities and assistance with relocation expenses where appropriate.

Ready for a position like this? Then please write for an application form to:

Mrs. G. K. Greenwood, Employment Officer,

The Boots Company Ltd.,

Head Office, Nottingham NG2 3AA.



CHELSEA COLLEGE
University of London

A SENIOR
COMPUTER
OPERATOR

is required for the College Computer Centre. The Centre is equipped with an ICL 4130 / POP 11 computer system providing a general batch/multiplex access terminal service. Access to the University CDC computer is also available.

Applicants should have a minimum of 5 years' experience in Mathematics and English, and at least two years' operations experience on mainframe machines. Salary in the range £3250-£3800 per annum (inclusive of London Allowance and Superannuation). A full allowance of £1400 p.a. is also paid for the staff's pension.

Applications to the Secretary, Computer Centre, Chelsea College, Fulham Road, Chelsea, London SW3 2PH. Telephone: 01-735 1244.

LONDON BOROUGH OF ENFIELD

A Person
to Specialise
in Software

£5,494-£6,055

Applications are invited for this post in the Borough's Department. The successful applicant will be responsible for advising on and implementing software development projects. In addition to supervising programming staff, the successful applicant will be responsible for the Borough's computer installation currently ICL 1902T and is developing a terminal interface for the ICL 1902T.

An application form is obtainable from the Borough's Civil Centre, Silver Street, Enfield, Middlesex, on or after the 2nd December 1977. Please send to: EN4/41.

MYRIAD
APPOINTMENTS
LIMITED

Computer Personnel Consultants

CHIEF PROGRAMMER

LONDON

£6000-£7500

We are currently recruiting for the position of Chief Programmer for our client in Central London.

The position offers senior programmers an opportunity to move into a management role whilst maintaining a fairly high degree of technical involvement.

Applications are invited from candidates who are able to offer sound COBOL programming experience on IBM hardware. You should feel confident enough to handle the running of a small programming department. Team leading experience would be an advantage but is not as important as management potential.

The salary for the position is negotiable but will not prove a problem area for the right person.

ASSEMBLER PROGRAMMERS

(DOS Systems Programming)

C. LONDON

c. £5000

This is an unusual opportunity to obtain a position as a SYSTEMS PROGRAMMER. Those selected will join the Systems Programming team immediately upon appointment and will receive full training in in-depth aspects of the operating system.

Successful applicants will progressively gain expertise in this specialist field. They can look forward to stimulating and lucrative career in an IBM 370 environment.

The basic requirement is about two years ASSEMBLER gained in a DOS or DOS/VS installation. A genuine desire to move into this more technical area is essential, as an interest in advanced software considerations is as important as previous programming experience.

The salary is negotiable dependent upon experience and all realistic applications will be considered on merit. The company is conveniently situated for all forms of London transport and for mainline stations.

SMALL SYSTEMS DESIGNER

Machine/Systems/Evaluation

BERKS.

£5500-£7500

This position presents an ideal opportunity for a person competent in both the technical and business issues involved with small systems to play an active part in developing new facets for small computers.

The successful candidate will carry out systems evaluation exercises and in addition to understanding the machinery will be familiar with the general range of business applications for which they are generally used.

Candidates should have implemented several systems on small computers and will probably be familiar with RPG II and Assembly level languages. A knowledge of IBM System 3 would be a distinct advantage, although applications are welcomed from people with experience of small Univac, Honeywell, Burroughs or ICL equipment.

The appointment is within a specialist team providing a hardware and software package evaluation service and is within a Company offering excellent conditions of employment.

SENIOR SYSTEMS ANALYST

BRENTFORD

c. £6000

A vacancy has arisen for an experienced Analyst, keen to work with on-line systems using TOTAL software. You will initially work on the specification of the system and go on to lead a team of Analysts and Programmers developing applications for both Accounts and Personnel Departments.

A background in either Operations or Programming, ideally using a Honeywell mainframe, would be an advantage; although experience of on-line systems would be equally useful.

The Company offers a pleasant working environment and a competitive salary; the opportunity of moving to a project management role within a year is also a real possibility.

Please telephone for a confidential
discussion or write to:
30 Fleet Street London EC4Y 1AA
01-353 5868

INTERNATIONAL SECURITY
PRINTING COMPANY

NEW MILDEN SURREY

We wish to extend the services provided by our ICL 2903 installation, and require the following additional staff:

Data
Processing Manager
£5400-£6500

Reporting to the Management Services Manager and working closely with user departments, the person appointed will be responsible for managing the Data Processing Department, developing the installation and introducing new systems. At least four years' experience is necessary in a senior computer operations position including project planning and control, systems design and report presentation. Knowledge of accounting routines would be an advantage.

Systems
Analyst/Programmer
£4700-£5600

Reporting to the Data Processing Manager, the person appointed will be required to lead and successfully complete a programme of projects to improve and develop the data processing systems and services within the Company. A good educational background and a minimum of two years' experience of systems analysis is required. Actual starting salaries will depend on individual qualities and experience, and will be supported by a substantial range of fringe benefits.

Please write or phone for an application form to:



The Personnel Office
SRADBURY WILKINSON &
COMPANY LIMITED
288 Burlington Road
New Malden, Surrey, KT3 4NH
Tel. 01-847 3271

ANGLIAN
D.P. SERVICES LTD
RECRUITMENT SERVICE

formerly ANGLIAN COMPUTER SERVICES

R.P.G. PROGRAMMERS

We have a number of Urgent Requirements for R.P.G. Programmers with 18 months' plus experience to work in Essex and Suffolk.

COBOL PROGRAMMERS

Numerous vacancies exist for Cobol Programmers with 1 year plus experience throughout East Anglia.

Experience is required on IBM, ICL and Honeywell Mainframes.

All salaries are negotiable and are highly competitive.

Phone: Denbury 4255 (STD 02454 1)

Lines open 24 hours

or write ANGLIAN D.P. SERVICES LTD,
Stretford House, Melton Road
Denbury, Chelmsford CM3 4QW



The Wine Society requires a

COMPUTER OPERATOR
(Single Shift)

For its ICL 2903 computer installation.

Previous operating experience essential, preferably on the above type of machine, also some knowledge of RPG would be an advantage.

Salary will be between £2,750-£3,000 depending on experience.

For further information please contact:

Mr. M. Scott
I.E.C. WINE SOCIETY
Gunpowder Road, Stevenage
Hertfordshire SG1 2BB
Telephone: Stevenage 4161

COMPUTER
PROGRAMMERS

are required to join a team of experienced staff to develop and maintain the computer systems of a major manufacturing company. The successful candidate will be responsible for the design, development and testing of computer programs. The position offers a competitive salary and excellent fringe benefits. Applications should be sent to: The Personnel Office, 288 Burlington Road, New Malden, Surrey, KT3 4NH. Tel: 01-847 3271.

CAPITAL APPTS.

GRADUATES

Urgently required for various positions in the following areas:

Commercial, Industrial, Scientific, Financial, Administrative, etc.

Salary from £3,000

ALL AREAS

Please for full details contact:

01-555 747/036 9659 ext.

"ON THE MOVE"
SALARIES TO £5,400

You could really go places with our Birmingham based client, a major force within the public services field, who are currently seeking to augment their existing team to cope with a tremendously exciting expansion programme.

DO YOU MEET THEIR REQUIREMENTS?

SYSTEMS
PROGRAMMER

- * a minimum of 3 years COBOL and PLAN experience
- * thorough knowledge of GEORGE II
- * in-depth communications experience preferably including MAXIMOP
- * the ability to liaise with technical staff

CHIEF PROGRAMMER PROGRAMMERS

- * potential to manage a programming team
- * minimum of 3 years' COBOL experience, with a knowledge of PLAN an advantage
- * working knowledge of GEORGE II
- * knowledge of communications software, and ideally systems design experience
- * a minimum 9/12 months COBOL experience in a commercial environment
- * A knowledge of GEORGE II
- * ideally, but not essentially knowledge of PLAN
- * a desire to gain KEY EDIT Programming experience

If you are looking to join a company offering genuine career prospects, excellent fringe benefits, relocation expenses and are confident that you can make a valuable contribution to their future development plans, which include a great deal of involvement in ON-LINE working, then contact without delay!

ANDY CARTER ON: 021-236 3781

REF. NO: CW/11/14

SPECIALIST COMPUTER RECRUITMENT LTD.

BIRMINGHAM 021-236 3781 FREEPOST
Freeport, Equity and Law House, 35-37 Great Charles Street, Cheltenham, Gloucestershire GL52 2BR

MANCHESTER 061-833 0676 FREEPOST

Freeport, Corn Exchange Buildings, Corporation Street, Manchester M4 8BD

LONDON 01-935 0671 FREEPOST

Freeport 4, 102 Blandford Street, London W1E 1JZ



01-353 5868

COBOL Programmers for 2900

Dataskil is involved in a number of exciting COBOL development projects controlled from Reading. This gives rise to an urgent requirement for top COBOL programmers of all levels with a minimum of two years' experience.

- If you:
- Have a sound knowledge of COBOL
 - Would like to work in a rapidly expanding environment involving applications such as DMS and TP
 - Would be excited at the opportunity of working

for a Company whose aim is to develop people with a wide variety of skills

- Can provide an enthusiastic and professional contribution to the development of major projects
- Are mobile

You may be the person we are seeking. In return we will offer you a salary in the range £47k, assistance with relocation expenses where appropriate together with the career prospects of working for Europe's leading Software House.

**Come and meet Dataskil in London
on Wednesday 23rd November**

Join Gerry Grundy and Dick Aulby for a drink and an informal discussion to find out more about the wide variety of job and career opportunities that Dataskil can offer.

Visit us between 4.30 pm and 8.30 pm
at the Mayfair Hotel, Berkeley Street,
London W1.

If you are unable to make this date we are still very interested to hear from you. It could only cost you the price of a telephone call or postage stamp to elevate your career to a level more varied, better paid and more satisfying.

Phone Gerry Grundy on Reading (0734) 581258 extension 129 or write to him with brief details of yourself and career to date of ICL Dataskil, Reading Bridge House, Reading, Berks. Please quote reference CW1583.

ICL Dataskil
The Computer Professionals

The William Press Group of Companies

The William Press Group of Companies are a Major Construction Organisation involved in Petro-chemical, Chemical, Steel, Electricity Generating, Nuclear, Gas and Water distribution work. Attractive salaries, commensurate with experience, will be offered, along with the normal fringe benefits usually associated with a major employer. Assistance will be given with relocation where justified. To cope with planned expansion, the following additional staff are required for the Group Management Services Department.

BUSINESS SYSTEMS ANALYST £6,000-£7,000

This responsible position will appeal to an experienced Systems Analyst with an appreciation of the broader aspects of business requirements. The successful applicant will have the responsibility for devising and implementing systems, computer based or manual. Experience in project control and the ability to communicate at all levels are essential for success in this interesting position, which will involve some travel within the United Kingdom.

SYSTEMS ANALYSTS £5,000-£6,000

An interesting opportunity has arisen in systems analysis and design for suitably experienced people with the ability to lead or work as part of a team that has a commitment to working to agreed schedules. These challenging positions offer a firm step on a well planned career path.

Applicants, male or female, should either write to, or telephone John Kingsnorth, Group Systems Manager, The William Press Group of Companies, PO Box 71, Wiltshire Lane, London N17 0SE. Telephone 01-808 3050.

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UNIVERSITY OF ABERDEEN COMPUTING CENTRE POST IN SYSTEMS HARDWARE/SOFTWARE

Invitations are invited for the following posts:

1. PRINCIPAL SYSTEMS PROGRAMMER

The person appointed will be the head of a systems group dealing with communications, microprocessors, systems and related projects. This will involve two main areas: processors, a range of communications equipment involving more than a hundred terminals and remote computers, the establishment of a communications network to other universities and a number of other development projects.

It is essential that the person appointed has an engineering background and has a good knowledge of software techniques, particularly in communications.

2. SYSTEMS PROGRAMMER

To join a systems group responsible for the maintenance and development of systems software for a large new system, Honeywell Q65/88, and related systems. This is one of the largest and most modern computing systems in any British University and serves the needs of a group of Scottish Universities plus providing specialist data base facilities for other universities.

Applicants for both posts should be holders of graduate and postgraduate qualifications and would be an advantage salary on the scale.

Principal Systems Programmer: £6433-7261
Systems Programmer: £3333-3827
with appropriate initial placing. Both scales are under review.

Further particulars from the Secretary, The University of Aberdeen, who whom applications (2 copies) should be lodged by 12 December, 1977. (Telephone: 0224-46241, ext. 810 Aberdeen 1963 for details.)

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- (6) Sales Technical Instructor for London. Must have successful selling record, capital office equipment or small computers - plus some experience of training instruction.

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- (8) Systems Analysts for London, Birmingham, Manchester and Leeds.

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North Sea Oil Exploration and Production JUNIOR PROGRAMMER Sunbury-on-Thames

Unionoil Company of Great Britain wishes to engage a Junior Programmer for the Exploration Department at Sunbury-on-Thames. The position provides an interesting opportunity for a young person with knowledge of EXTENDED BASIC and with experience of WANG 2200 equipment.

The successful applicant would report to the Chief Geophysicist and be responsible for optimising and extending an existing geophysical/geological mapping and data reduction software package and supervising the digital ion of related data.

This position offers a very competitive salary and benefits package and interesting career opportunities with an international oil exploration and production company.

Interested individuals, male or female, should respond in writing to the address below. All responses will be held in strict confidence.

Manager, Administrative Services,
Unionoil Company of Great Britain,
32 Cobden Road,
Sunbury-on-Thames,
Middlesex.
Telephone: Sunbury-on-Thames 85600.

UNION 76



Volkswagen (GB) Limited are investing £7.5 million in a new centralised warehouse and administrative complex, occupying a 23 acre site in Milton Keynes which will be opening next Summer.

However, we believe that investment in the future prosperity of the Company includes far more than just bricks and mortar - it includes excellent opportunities for professional, ambitious people who will progress and prosper with us.

VOLKSWAGEN

We shall be at the Bedford Arms Hotel, Woburn on Friday, 25th November between 4 pm and 10 pm and on Saturday, 26th November from 9.30 am until 3 pm and we would very much like to meet you for an informal chat to tell you about our move and the opportunities it will provide.



Audi

Project Leaders, Systems Analysts and Programmers- we're on the move- join us.

We will be operating an I.B.M. 370/148 under OS/VS1, with both local and remote V.O.U.'s and Printers. Major development is now taking place on our parts and vehicle systems which will extensively utilise both database and teleprocessing techniques under the control of TOTAL and ENVIRON/1.

The salaries are competitive - Programmers to £5000. Systems Analysts to £5500. Project Leaders to £6500 - and our attractive fringe benefits include a minimum of 4 weeks holiday, a generous car purchase and lease scheme, a first rate pension and life assurance scheme and subsidised meals. In short a very progressive Company.

The work is challenging in a constantly changing environment and there are excellent opportunities for advancement. If you have the sort of experience we are looking for and you want to work in a very progressive company, then we will certainly be of interest to you. Initially you will be based in temporary offices in Milton Keynes.

Come along on Friday or Saturday - there's no need to make an appointment. If you can't make it then and would like an application form then please telephone (01-668 4100) or write to Paul Campion, Personnel Department at Volkswagen (GB) Limited, Volkswagen House, Brighton Road, Purley, Surrey CR2 2UO, or any technical queries can be answered by Paul Regan, Management Information Systems Manager at Ramsgate (0843) 55544. Please reverse charges if you telephone either number.

COMPUTER PROGRAMMERS

Mand Division is the largest manufacturing Division of ICI with offices located at Northwich and Runcorn. Computers play a vital role in all of the Division's activities - Production, Technical, Commercial and Accountancy.

Additional experienced Application Programmers and a Systems Programmer are needed to support major new developments in the Division's computing. At least 3 years' experience of application programming or systems programming for major projects on large main frame computers is required.

Currently the Division operates a 4MB IBM 370/158 121 CVMPI installation running under MVS. A major expansion of this installation is planned. The Division will also shortly install a DEC-K10 computer to provide increased time shared interactive computing for its technical staff. On-line and interactive terminals linking remote locations to the central installations together with a number of mini computers form the basis of a planned network of computing facilities throughout the Division.

For the Application Programmer posts, a knowledge of IBM or DEC-10 assembler languages is desirable and candidates must have a minimum of 2 'A' levels.

For the Systems Programmer post, which includes user support for the DEC-10, experience with an assembler level language and a degree in a technical subject are necessary.

For all posts, knowledge of PLI, BASIC or FORTRAN would be advantageous. Salaries are competitive with attractive pension and profit sharing schemes, and re-location allowances where appropriate.

Applicants of either sex should write with brief career details to:



Recruitment Section,
Personnel Department,
ICI Mand Division, P.O. Box 13,
Runcorn, Cheshire.

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Fully committed to the role of the computer in effective local government we've a well established and developed Computer Services Division.

The hardware comprises an ICL 192K 1803T under Geoga-3 with MOP and Detective facilities.

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You can make an important contribution to the work and you'll be very well paid in return. The salary is negotiable between £3825-£5050 inc. We work a 35 hour week with up to 26 days' annual holiday plus nine statutory days. If you think you're the young man or woman we're looking for with a minimum of 18 months' experience of 1800 Cobol and ideally a knowledge of operating under Geoga-3, write with full personal and career details to:

Computer Services Manager
Toughen Hall, High Street, London
SW18 2PL, by November.

INSTITUTE OF HYDROLOGY COMPUTER OPERATORS/SHIFT LEADER

Hydrology is a computer intensive job. In the Institute of Hydrology, a computer body of the Natural Environment Research Council, the Institute operates a UNIVAC 1100 computer to process data associated with its research activities and to provide substantial computer facilities for other NERC institutes and a communications network.

The Institute is currently operating a single shift 0830 to 1730 with alternate Saturday mornings as a second shift. Full working will be introduced soon and so the successful candidates must be prepared to undertake shift work.

Qualifications: Preference will be given to applicants having at least 2 years' experience of operating a medium size computer with data and magnetic tape peripherals and terminals. However, less experienced personnel will be considered and trained if required.

Salary and Conditions: Appointments will be to the Data Processor or Senior Data Processor grade depending on qualifications.

Data Processor: 130 70 p.w. plus CO and Stage 2 supplement - 18 days' paid annual leave. Senior Data Processor: £2075-£2885 p.w. plus CO and Stage 2 supplement: 20 days' paid annual leave.

A premium of up to 20 per cent is given for shift work. The Institute is currently operating a single shift 0830 to 1730 with alternate Saturday mornings as a second shift.

Write for application forms quoting reference 02/1/82 to Institute of Hydrology, Millbrook Building, Chesham, Bucks HP8 4NP, or telephone Wandsworth 38000.

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REF. NO. CW/11/18



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You will ideally have experience with GCOS 201/1 or GCOS, and a knowledge of Honeywell level 64s would be a distinct advantage.

The actual starting salary (inclusive of shift allowance) will depend on experience and will be supported by a substantial range of benefits including free lunches.

If you are looking for a job now or for the New Year, then please telephone Pat Donnelly for an application form, or write to her giving brief personal career details at Whitbread & Co. Ltd., Chiswell Street, London EC1Y 4SD. Tel: 01-606 4455.

WHITBREAD



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SALARY £4,500 to £7,500 p.a.
with additional benefit

Alimand Management Services Ltd. have specialised with an acknowledged degree of success in Mini-Computer applications currently concentrated in the banking and financial sectors.

Following rapid and steady expansion we are currently recruiting efficient and mature personnel to fill interesting and demanding assignments in the UK and the Americas. There are a range of opportunities from one year's experience upward, with details of experience to Alimand Management Services Ltd., 250 Brompton Road, London SW3 2AT.

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A vacancy has become available in our Financial Accounts Department, to assist the Computer Operations Supervisor.

The successful applicant, aged 22 or over, will have had one year's experience, preferably including NIXORF equipment, and will have a responsible outlook to his/her work.

The main duty will be to correctly process daily work schedule as supplied. Basic hours of duty will be from 12 noon to 8 pm, Monday to Friday, which will require an ability to work on own initiative.

A good starting salary will be negotiable, together with the usual fringe benefits associated with a large company.

Please write with full details to: Mrs. S. Parker, Charrington and Company, Anchor Brewery, Mile End, London E.C.1. Telephone Number 01-790 1880.



Manchester System Designers/ Programmers

- Standard Software Development
- There are vacancies at senior and intermediate levels for a number of System Designers and Programmers to join the highly successful team developing real-time standard software for the ARGUS 700 range of computers. These are attractive openings for competent professionals who are looking for technical challenge and advancement. Candidates should have at least two years' experience in the real-time field and successful applicants are likely to have a degree in computer science, mathematics or one of the physical sciences. Recent experience in any of the following areas of software would be an advantage:
 - Multi-access job control
 - Terminals, emulators and remote batch terminals
 - Alphanumeric and semi-graphic VDU's
 - Development of the BASIC programming language
 - Peripheral control
 - Standard utilities
 - Standard process control software

Customer Support
We are also seeking software support staff whose task is to help customers by correspondence, telephone and site visits to obtain the greatest benefit from their systems and to find the root cause of any software faults. We aim to provide software support of a very high quality and we give support staff the opportunity to develop the widest possible understanding of operating systems and languages. Successful applicants are likely to have at least three years' experience with real-time operating systems but a friendly, diplomatic manner and tenacity of purpose are at least as important.

FERRANTI LIMITED is a wholly British Company. We design and manufacture the ARGUS 700 range of computers and are European market leaders in supplying real-time industrial process control and on-line data communication systems. Being system suppliers as well as equipment manufacturers our staff are able to see projects as a whole and the interactions between hardware and software design are within their direct control. Professional development is encouraged. Competitive salary levels will be offered. Generous relocation allowances are available where appropriate. Our offices and laboratories are in a pleasant part of South Manchester, close to very good residential areas. Apply in the first instance to Mr. W. L. Robinson, Ferranti Limited, Simonsway, Wythenshawe, Manchester M22 5LA giving brief career details (quote reference SDP/CW).

Informal Interviews
If you would like an informal discussion on career prospects with Ferranti in any branch of computer system design, software, project engineering, sales or customer support, senior members of our staff will be happy to meet you at one of the following times and places:

MANCHESTER: Grand Hotel, Tuesday 22nd November, 4.30pm to 8pm
ALTRINCHAM: Cresta Court Hotel, Thursday 24th November, 4.30pm to 8pm
LIVERPOOL: Adelphi Hotel, Tuesday 29th November, 4.30pm to 8pm
STOKE-ON-TRENT: George Hotel, Burslem, Thursday 1st December, 4.30pm to 8pm
Don't make an appointment - just arrive

FERRANTI

Wythenshawe Division, Manchester.

Compex Computer Services

Olney, Bucks.

Compex is an established company specialising in the development of commercial systems and standard packages based on both mainframe and sophisticated minicomputer hardware.

The steady expansion of the company's client base has created the need for additional D.P. professionals to complement the existing team.

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Salary c.£5750 with bonus

This position will appeal to an experienced analyst/programmer who enjoys a high level of responsibility and a wide variety of interesting work.

The successful candidate will be involved in all aspects of systems development including feasibility study, pricing, project control and implementation.

For further details, phone Les King up to 8 p.m. or write to: Modern Computer Services, FREEPOST, London, SW11 6BR, 01-228 2283.

PROGRAMMERS

Salary c.£4300 plus overtime

Applications are invited from experienced programmers who have the ability to work in small teams with total systems involvement.

This is an outstanding opportunity to work on several manufacturers' hardware using assembler languages, COBOL and other high-level languages. The technically advanced environment will also include the use of both teleprocessing and database techniques.

MODEM

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JOBS IN THE MIDLANDS

Computer Weekly will once again on December 1st highlight job opportunities in the Midlands. To secure advertising space in this important feature contact:

Birmingham: Alan Esott 021-355 4838
London: Anne Wilson 01-261 6098

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We have been retained to recruit experienced sales executives for a well-known and respected company in the computer services industry. The opportunities arise from the company's plan to develop substantial new business based upon both conventional batch processing and comprehensive communications facilities.

Desirable experience for these appointments will include:

1. bureau software services.
2. mini computers / VRC / small business systems.
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These are exceptional opportunities for candidates seeking a successful career.

Please contact the Senior Consultant on 01-488 5644, quoting CW 182.



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London W1M 4AJ
Telephone: 01-488 5644

SYSTEMS PROGRAMMER

The Military Aircraft Division of British Aircraft Corporation has a comprehensive range of high-technology products including the Jaguar and Tornado supersonic aircraft. Its computing facilities are commensurate with the sophistication and scale of these projects.

A Systems Programmer is required in the Commercial Data Processing Department to assist in the maintenance and development of the operating system and associated software.

Applicants should have two years' OS systems programming experience, with a good knowledge of Assembler. Further training will be given where necessary.

The installation comprises an IBM 370/158 (13 megabyte) operating under OS/VS1. VM has been generated to assist in operating system development.

The position offers the conditions of service appropriate to a major and progressive organisation. Relocation expenses may be payable to the successful applicant.

Please phone or write for an application form to:-

Chief Personnel Officer,
British Aircraft Corporation,
Military Aircraft Division,
Strand Road,
Preston, Lancs. PR1 8UD.
Tel: Preston 54722 Ext. 3

British Aircraft Corporation... a
BRITISH AEROSPACE
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The job: to develop and effectively manage sales effort within a fast-growing specialist division of one of the U.K.'s leading computer bureaux offering both on-line and batch facilities. Career opportunities are excellent in this dynamic, professional group.

The person: a sales professional with a proven track record in the computer bureau field is an absolute essential. Preferably a senior sales executive with managerial ability, ambition, drive and determination who will build a small team of dedicated salesmen committed to continuing the rapid growth of this important sector of the company's activities.

If you think you fit the bill, show us by telephoning Pat McGowan on 01-242 0747 any time on Friday or Monday.

COMPUTING ASSIGNMENTS UK AND OVERSEAS

PROGRAMMERS AND SYSTEMS DESIGNERS EUROPE

We require applicants with experience of Airline Ticket Reservation and Cargo Handling Systems. Knowledge of Univac, IBM and ICL Mainframes is necessary. There will be opportunities to work in Scandinavia and the Middle East. Ref. MS 11/12

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We are recruiting people with Mini Computer Real-Time Experience in Message Switching Communication Systems. Knowledge of POP 11, RSL, ILM, Argus 300, 500, 700 Minis and Corel 88 and Assembler Languages necessary. Vacancies exist in Scandinavia, Benelux, Germany and U.K. Ref. MS 11/13

PROGRAMMERS, ANALYSTS AND SOFTWARE DESIGNERS

Excellent opportunities for candidates with Real Knowledge of ICL 1800/2801 4 New Range Hardware and Language ability using Cobol, Plan, Fortran, Algol, PL/I, Pascal and C. Vacancies exist in the North, Midlands and Central London.

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Candidates are needed with experience of Intel, Zilog, Motorola or Texas Instruments microprocessors with knowledge of Mathematical Modelling, Avionic Simulation Techniques and Signal Processing. Vacancies exist in England, Germany and U.K. with mobile users and software houses. Salaries range from £5,000 to £15,000. Please write to: John Bealey, Delta Software (Pty) Ltd., 10-127, 100A, 204 Sutton Road, London NW11 3BD

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You should already have a proven track record of success in this field. This, coupled with management potential and the ability to inspire confidence in both clients and applicants will earn you a salary of c. £10,000 p.a., made up of a high basic salary plus commission and profit share, and benefits which include free PPP.

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The company has taken significant steps forward in quality assurance and now wishes to make two senior appointments in this area. One of the men or women appointed will head up an energetic project team, while the other, as part of this quality assurance team, will be actively involved in its problem-solving role.

The main responsibilities will be to provide functional direction, technical guidance and co-ordination to a team of programmers engaged in the evaluation of new software projects.

Requisite experience for these posts will have been gained over a period of 5 years in software development of computer operating systems. Additionally

some knowledge is required of the techniques involved in evaluating and testing, to detailed standards, of software products.

To ensure that the correct calibre of people are appointed, the company offers an extremely attractive remuneration package with the salary level being determined by the experience of those selected. Other conditions include a 35 hour week, pension and life assurance schemes and generous relocation assistance to this high amenity area (Ref: ES708/CW).

REPLIES will be forwarded direct unopened and in confidence to the client unless addressed to our Security Manager listing companies to which they may not be sent. They should include comprehensive career details, not refer to previous correspondence with PA and quote the reference on the envelope.

PA Advertising

127 George Street, Edinburgh, EH2 4JN. Telephone: 031-225 4481



A member of P.A. International

UNIVERSITY OF ST. ANDREWS

Administrative and Library Computer Unit
Applications are invited for a post of
PROGRAMMER / ANALYST

In the above unit which uses a new CIL 8080 computer dedicated to Administrative Computing. New systems are being written for these areas: Finance, Student and Personnel records, and Library automation, using COBOL and CORAL. The vacancy is for a programmer/analyst, preferably a graduate, to work in the general area of information systems. Experience of a university environment would be an advantage.

Salary at appropriate point, according to qualifications and experience, on one of the scales £3804-£4011 or £4011-£3927 (under review). Superannuation under F.S.S. (U.K.) or U.S.S.

Applications, with the names of three referees, should be sent by 2nd December, 1977 to the Establishment Officer, the University of St. Andrews, College Gate, St. Andrews, Fife, from whom further particulars may be obtained.

COURSES

ADVANCED
The course is suitable for both experienced and inexperienced people and is presented in a practical manner. It covers the practical aspects of the design and development of a system and the use of a variety of software packages.

For further details contact: PAI, 100A, 204 Sutton Road, London NW11 3BD

THE ROYAL FREE HOSPITAL

RESEARCH SCIENTIFIC OFFICER COMPUTING

Salary within the range £2,540-£6,517 depending on qualifications and experience, and including all allowances.

A graduate is required to join a small team of physicians and clinicians engaged in a project to control, by computer, a unique cobalt unit for the treatment of cancer by radiotherapy in which by tracking along the body irregular shaped volumes of tissue may be treated. The system will consist of a T.E.M. Cobalt 60 unit module for on-line control by a P.P. 21 MX mini computer. The person appointed will be expected to take an active part in the overall development and implementation of treatment control techniques. In particular, he or she will be responsible for writing software for the fully automated control of this unit. Experience of software development using both high and low level languages and the control of special purpose peripheral devices would be desirable. The work will provide a valuable introduction to medical computing.

This is a permanent position which is to be financed by the Imperial Cancer Research Fund and is for one year initially, with the possibility of a further appointment for two years and a suitable candidate would be encouraged to register for a higher degree.

Applications should be sent to: 30th March 1978 (1977) from The Personnel Department, The Royal Free Hospital, 21 Pond Street, London, NW3 2AF. Tel: 01-744 0431.

Candidates and Information Agents
Health Authority (17)

Application 1-14

SELL, MARKET, SUPPORT THE SYSTEMS OF THE FUTURE TODAY!

We are recruiting for a truly exciting U.S. and Internationally based mini computer supplier, whose products are taking the commercial, industrial and OEM market places by storm. Their products are in the very forefront of computer technology, and they have today what many of their competitors talk of having tomorrow.

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Base Salary: circa £6,500 on quota earnings
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Opportunities exist for two professional salesmen with proven track records in the mini computer market place. Ideally candidates living within a fifty mile radius of Manchester or Bedford are required. However generous relocation expenses will be paid to suitable applicants. Responsibilities will include management of existing accounts and the development of new business, in this exciting and fast moving market place. Excellent state of the art products for wide ranging applications are available, backed by excellent technical support.

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Salary to £6,500 plus profit sharing

Our clients require three technical support engineers to provide technical know-how to the rapidly expanding U.K. and International market place. Candidates should be well versed in mini computer software and hardware, and should possess the communicative skills necessary to give high-level presentations to customers, discuss software capabilities, and provide consultancy services to the user base. Applicants should have a good grounding in mini-computer operating systems and have experience on one or more of the following languages: COBOL, FORTRAN or BASIC.

Candidates for all the above positions should be ideally aged between 25-35, and be educated to HNC/Degree standard. Our clients offer above average terms and conditions of employment, including relocation package, pension scheme, non-contributory life assurance and private patients plan. Initial interviews will be held in Manchester, Birmingham and London.

CONTACT: DAVID WADE ON 061-833 0676.

REF. NO. CW/11/1.

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LONDON 01-935 0671 **FREEPOST**
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DATA TERMINAL SALES ENGINEER

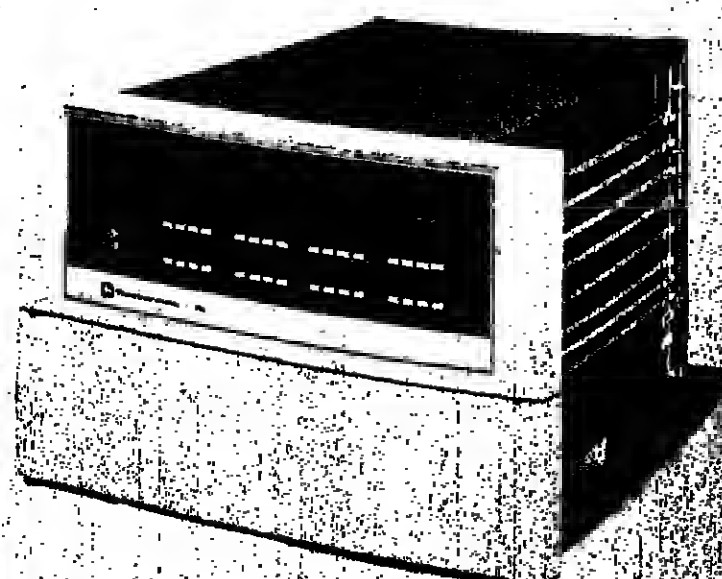
Base Salary circa £5,500, on quota earnings
circa £8,000 plus 2 litre car, plus profit sharing

For this position our clients require a professional salesman with a proven track record in this fast moving, high volume sector of the market. Our clients offer a comprehensive range of intelligent and non-intelligent devices, utilising some of the most advanced technology available. Location for this position—ideally within daily travelling distance of Slough, although generous relocation expenses will be paid, where necessary.

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Salary to £6,500 plus profit sharing

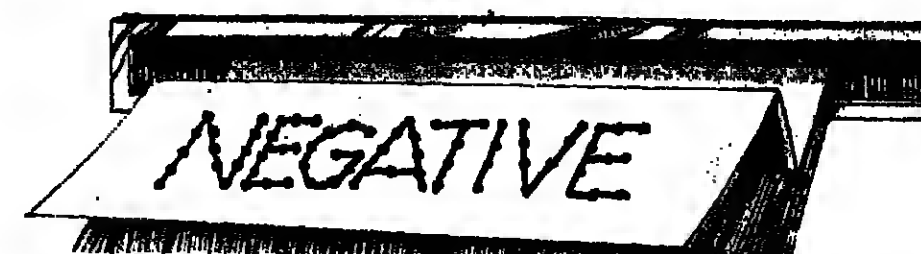
These are out-of-the-ordinary opportunities for technical or sales people to move into a true product marketing role. You will need to be technically qualified to HNC or Degree level, and have a minimum of two years mini-computer experience. Responsibilities will include market research and analysis, product specification, merchandising and sales strategy. The production of quotations and proposals from a technical and profitability viewpoint, will be required.



SIEMENS

Senior Systems Programmers £12,500-£16,000

Are you a highly qualified
D.P. Professional being
held back by your computer?



Why not take a positive step and join a major worldwide organisation in the field of electronics and electrical engineering with a business volume of £5,000 million +.

The Siemens Data Systems Group in the last 20 years has established itself as a leading European Manufacturer of computers and computer peripherals. Our computer activities are undergoing substantial expansion, with a present annual turnover of £300 million.

For our systems software development teams we are looking for approximately 15 highly qualified professional men or women who are interested in further developing their DP skills in an environment with excellent technical facilities and extensive financial resources.

TO WORK IN WEST GERMANY OR BELGIUM IN THE FOLLOWING FIELDS:

Development of Operating Systems -

for all phases of operation systems development from design to implementation and tests. Based in Munich or Namur.

Teleprocessing Software -

for the development, test and performance measurement of systems software for Data Communications Systems involving: computer networks, virtual terminals, data communication access methods, communications protocol and transaction systems. Based in Munich.

Systems Integration and Test -

to integrate large operating systems and associated products including functional stability, regression and performance testing. Based in Munich.

Ideally all candidates will have the following background: more than five years' DP experience with a minimum of three years in at least one of the above mentioned fields. A Science Degree and knowledge of German or French would be an advantage but not essential.

Relocation costs will be paid.

For application forms and further information, please contact: Ray Parker, Personnel Department, Siemens Ltd., Siemens House, Windmill Road, Sunbury-on-Thames, Middlesex. Tel: Sunbury-on-Thames 85691.

HERTS AND NORTH LONDON

We specialise in D.P. recruitment for clients in Herts and North London and the following vacancies are taken from our current register:

BOREHAMWOOD

Possibly the ideal installation - not too large nor too small, 1964 based, informal, friendly but very professional. The vacancies are for a Programmer (to £4,000) with 1 years' Cobol experience and an Analyst (to £5,000) to join a department of ten engaged in the development of both batch and Real Time Systems. Although applicants must have worked in a commercial environment neither IBM nor Real-Time knowledge is necessary.

STANMORE

Centred around an IBM 370/125 and 2 Vantek minis using on-line VDU's for Stock Recording, our client has a vacancy for a Systems Analyst to make up a team of three shortly to begin development of financial real-time VDU systems. Commercial IBM experience is a basic requirement - real-time training will be given where necessary (up to £5,750).

MARYLEBONE

An opportunity to move into Systems/Programming - our client has vacancies for two experienced COBOL programmers (up to £5,000) with a good knowledge of Assembler to join their IBM 370/145 installation conveniently located by Baker Street tube station. Naturally some knowledge of Systems/Programming would be preferred but otherwise full training will be given.

CHESHUNT

Situated just north of Enfield a highly developed JCL-based organisation currently has vacancies for Software Programmers with experience in COBOL and Plan (up to £5,500) and Commercial Analysts and Senior Analysts (up to £5,000). The installation is known for its first-class working conditions and liberal attitude towards career progression.

CITY, E.C.1

Small IBM System 3 R.P.G.I.I. installation, shortly to include a Univac 8025, is seeking an Analyst/Programmer (up to £5,000). The role includes investigation, design and development of Order Entry/Invoicing systems in addition to being responsible for the supervision and guidance of the Programmers within the team (up to £4,750).

LUTON

Small department of 12 Analysts and 3 Programmers has a vacancy for an Analyst/Programmer with POP Basic experience to assist a Project Leader in the investigation, design and development of Order Entry/Invoicing systems in addition to being responsible for the supervision and guidance of the Programmers within the team (up to £4,750).

For more information ring:

HAYMARKET

COMPUTING LTD.

Tel. Cuffley (Herts.) 4130

up to 7.00 p.m.



UNIVERSITY OF ABERDEEN COMPUTING CENTRE

PROGRAMMING ADVISER

Invitations are invited for the above post within a mathematical and scientific advising group. Applicants should have a good honours degree in mathematics or a science subject together with appropriate experience of programming in Fortran or another scientific language. A knowledge of statistical methods would be an advantage.

Salary on scale £3333-£5827 p.a. (under review) with appropriate initial phasing.

Further particulars from the Secretary, The University of Aberdeen, with whom applications (2 copies) should be lodged by 12th December 1977. Telephone 0224 40241, extn. Old Aberdeen 5353 for details.

WESSEX REGIONAL HEALTH AUTHORITY

DATA PREPARATION TEAM LEADER

required for our Computer Centre at Wexham, Wiltshire. Applications are invited from suitably qualified and experienced persons to be responsible for the Data Preparation Supervisor for a small team of Key Entry Operators. Candidates should, ideally, be experienced in Key to Disc.

Good working conditions and career opportunities.

Salary Scale: Supervisor 1, £2,920 rising to £3,085, inclusive of supplements.

Job Description and Application forms available from the Personnel Officer, Wexham Health Authority, Wexham, Wiltshire. Telephone: Wexham 69111, ext. 390/471.

Closing date: 29th November 1977

Senior Systems Analyst

HARROGATE

An additional post of Senior Systems Analyst has been created in the Computer Branch of CEBB North Eastern Region as part of the planned expansion to fulfil the Region's increasing dependence on data processing. The Branch is responsible for computing development and production work on the Regional mainframe computer, and also bears functional responsibility for all the twin 370/168 installation at Board Headquarters in London.

Plans are now in hand to replace the ICL 1904S mainframe computer by a current generation system, which will be capable of supporting remote terminals throughout the Region, and interconnect with the existing National network of ICL 7905s. A controlled growth of distributed computing at the larger power stations is foreseen, in which Systems Analysts will be closely involved.

The main area of activity for the successful applicant, will be the development of DP systems for all aspects of power station management, with a particular emphasis on control on maintenance work, to maximise reliability of plant. The importance of this is indicated by the additional cost of supplying demand, when a large modern generating set is out of service, the amount currently ranges from £50,000 to £100,000 per day for coal fired plant, and over £150,000 per day for nuclear plant.

Applicants should have a degree or professional qualifications, and extensive experience of systems analysis and design.

The salary will be within a range of £5,500 to £8,850 per annum with possible progression to £7,550 per annum subject to review.

Point of entry will depend upon experience, qualifications and training.

Applications in writing, giving details of age, experience, qualifications, present position and salary should be forwarded to the Regional Personnel Manager, Central Electricity Generating Board, North Eastern Region, P.O. Box 177, Merion Centre, Leeds LS1 1RL, to arrive not later than Wednesday 30 November 1977 quoting reference SVN/723C.



The Research and Statistics Group of the Inner London Education Authority

Senior Programmer (Professional B)

to work on a number of applications in the field of education statistics

Applicants must have had a minimum of two years' experience of FORTRAN programming preferably in an IBM 380/370 environment, and should be accustomed to handling large and complex databases. Acquaintance with CRJE and SPSS would be an advantage.

The successful candidate will be expected to provide assistance and advice to less experienced staff, and will need to be able to communicate with researchers, statisticians and administrators.

Salary Scale £4,442.80 - £8,068.80 (inclusive of London Weighting and Phase 1 and 2 Supplements).

Details and application forms from the Education Officer (EO/Enab. 2A/1), Room 2B7, County Hall, London, S.E.1 7PB. Please enclose a stamped addressed envelope.

Forms to be returned by 6 December, 1977.



Anglian Water Authority

HEADQUARTERS - FINANCE
DEPARTMENT
Ref. FIA/30 (Post No. H3C020)

SENIOR AUDITOR

Grade 8 - £8,731-£9,142

This is a new post related to the installation of the Authority's dual Honeywell 68/10 384K Computer which will be linked via a twenty-two line network with over seventy terminals throughout the Authority's region and also to the introduction of the Authority's direct billing system. The person appointed will work with the Computer Auditor and should be a member of a recognised accountancy body with experience of working in a large date-processing environment. This is an exciting opportunity to become involved in the development of new computer-aided audit techniques. Audit has its own dedicated terminal system and high level access to the data-base. This post forms part of the Headquarters computer audit team.

This post is located at the new Brook House, Huntingdon office and computer centre with first class working conditions. Generous relocation expenses are paid in appropriate cases.

NJC for Water Service. Brief Conditions of Service apply and the post is supernumerary.

Job description and application forms to be returned by 1st December 1977 are obtainable from the address below.

For further information telephone: Grams, Chief Internal Auditor, or Huntingdon 0480 68181

Personal Department
ANGLIAN WATER AUTHORITY
Brook House, Huntingdon, Cambs, PE18 5NZ

THE SALES BIT

Curse of the annual budget

THE curse of the computer industry is the annual budget syndrome. One could easily gain the impression that nothing existed before January 1 this year nor will have any relevance after December 31.

It's all very well setting short-term objectives for companies and salesmen, but in an industry and technology moving as fast as ours, one cannot leave tomorrow to look after itself.

This is particularly relevant when it comes to training in general and sales training in particular.

The managing director of one of our associate companies said to me recently, "If 40 competent salesmen walked into my office right now, I could have them all re-employed by teletime." Such is the shortage of good salesmen. And why?—because the industry, by and large, is not growing them.

And why are they not being grown? — because the "learning-curve" makes it difficult for a trainee salesman to make a significant contribution of new business within the time frame of the one-year budget in which his employment commenced.

Therefore, it appears that a better return in a shorter time can be attained by recruiting experienced professional salesmen, who can apparently commence effective selling from day one. In other words steal somebody else's!

This incestuous situation is both inefficient and unnecessary. If only computer companies would invest in producing their own salesmen at the trainee level within the context of a longer term investment, controlled perhaps within a perennial "moving budget".

There are many good people who would leap at the chance of entering the sales profession and could well be very successful. They could be experienced salesmen who do not currently have direct involvement with computers, or people who know about the application of computers and need to learn the basic skills of selling. Right now most computer companies have no interest in such recruits.

So, until we get everyone on three/five year "moving budgets" with annual sub-sets, it is likely that companies will overlook sales trainees and rely instead on the vagaries of recruiting salesmen from their competitors who are unlikely to ever have the loyalty and enthusiasm for the company that is typical of the home grown variety.

What a way to run a business!

TRADER

Puzzle answer

ANSWER: 12191

12191